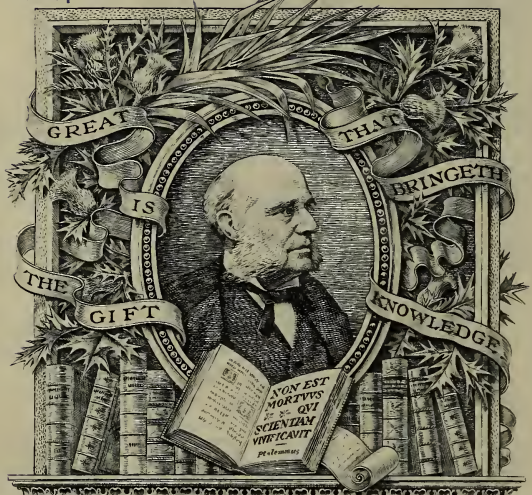
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THE M. A. C. BULLETIN

AMHERST, MASS.

Vol VI. No. 1. For January, 1914

Published Six Times a Year by the College.

Jan., Feb., Mar., May, Sept., Oct.

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CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE,

1913-1914.

FIFTY-FIRST ANNUAL REPORT.

PART II.

BOSTON:

WRIGHT & POTTER PRINTING CO., STATE PRINTERS,

32 DERNE STREET.

1914.

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.—*Act of Congress, July 2, 1862.*

Withdrawn

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1913-1914.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1914.

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Approved by
The State Board of Publication.

The Massachusetts Agricultural College.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue. Special publication will be made should it become necessary on account of important changes.

CALENDAR.

1914-15.

REGULAR COURSES.

1914.

January 5, Monday, 1 P.M.,	Winter recess ends; regular schedule of classes.
January 23, Friday, 8 A.M.,	Semester examinations begin.
February 2, Monday, 1 P.M.,	Second semester begins; regular schedule of classes.
February 23, Monday forenoon,	Half holiday, observance of Washington's Birthday.
March 27, Friday, 5 P.M.,	Spring recess begins.
April 6, Monday, 1 P.M.,	Spring recess ends; regular schedule of classes.
April 20, Monday forenoon,	Half holiday, observance of Patriots' Day.
May 30, Saturday,	Holiday, Memorial Day.
June 1, Monday, 8 A.M.,	Senior and junior examinations begin.
June 6, Saturday, 8 A.M.,	Sophomore and freshman examinations begin.
June 13–17, Saturday–Wednesday,	Commencement.
June 18–20, Thursday–Saturday,	Entrance examinations.
September 2–5, Wednesday–Saturday,	Entrance examinations.
September 9, Wednesday, 1.30 P.M.,	First semester begins; chapel.
October 12, Monday forenoon,	Half holiday, Columbus Day.
November 25–November 30, Wednesday, 12 M.–Monday 1 P.M.,	Thanksgiving recess; regular schedule of classes.
December 18, Friday, 5 P.M.,	Winter recess begins.

1915.

January 4, Monday, 1 P.M.,	Winter recess ends; regular schedule of classes.
January 22, Friday, 8 A.M.,	Semester examinations begin.
February 1, Monday, 1 P.M.,	Second semester begins; regular schedule of classes.
February 22, Monday forenoon,	Half holiday, Washington's Birthday.
March 26, Friday, 5 P.M.,	Spring recess begins.
April 5, Monday, 1 P.M.,	Spring recess ends; regular schedule of classes.
April 19, Monday forenoon,	Half holiday, Patriots' Day.
May 31, Monday,	Holiday, observance of Memorial Day.
June 1, Tuesday, 8 A.M.,	Senior and junior examinations begin.
June 5, Saturday, 8 A.M.,	Sophomore and freshman examinations begin.
June 12–16, Saturday–Wednesday,	Commencement.
June 17–19, Thursday–Saturday,	Entrance examinations.

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Massachusetts Agricultural College.

History. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of nearly all the buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the federal station, and subsequently the whole was incorporated with the college.

Courses. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-years[1] course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science and doctor of philosophy. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and summer school. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, educational exhibits, lecture courses, demonstrations, and circulating libraries.

Purpose of the College. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, for scientific experts in chemistry, entomology,

[1] Twenty-six teaching departments offer instruction in agriculture, horticulture, sciences, the humanities and rural social science. A system of major courses permits a student to elect work in 1 of 14 departments and to specialize in that and allied subjects for a period of two years.

botany and microbiology and for business operations having connection with practical agriculture.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, botany and zoölogy, are an essential preparation. Still other students find the course a desirable education, without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which a major course is offered.

Location and Equipment. — The agricultural college is located in the town of Amherst. The grounds comprise more than 600 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

The Massachusetts Agricultural Experiment Station.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was then without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college, and was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about one-third of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to a committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, experimentation and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

THE CORPORATION.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
CHARLES E. WARD of Buckland,	1914
ELMER D. HOWE of Marlborough,	1914
NATHANIEL I. BOWDITCH of Framingham,	1915
WILLIAM WHEELER of Concord,	1915
ARTHUR G. POLLARD of Lowell,	1916
CHARLES A. GLEASON of New Braintree,	1916
FRANK GERRETT of Greenfield,	1917
HAROLD L. FROST of Arlington,	1917
CHARLES H. PRESTON of Danvers,	1918
FRANK A. HOSMER of Amherst,	1918
DAVIS R. DEWEY of Cambridge,	1919
GEORGE P. O'DONNELL of Northampton,	1919
WILLIAM H. BOWKER of Concord,	1920
GEORGE H. ELLIS of West Newton,	1920

MEMBERS EX OFFICIO.

His Excellency Governor DAVID I. WALSH, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
DAVID SNEDDEN, *State Commissioner of Education.*
WILFRID WHEELER, *Secretary of the State Board of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor DAVID I. WALSH, of Boston, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
WILFRID WHEELER of Concord, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

STANDING COMMITTEES OF THE CORPORATION.[1]

Committee on Finance.

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
CHARLES E. WARD.
FRANK A. HOSMER.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, *Chairman.*
WILLIAM H. BOWKER.
FRANK A. HOSMER.
DAVID SNEDDEN.
ELMER D. HOWE.
DAVIS R. DEWEY.
GEORGE P. O'DONNELL.

Committee on Farm.

NATHANIEL I. BOWDITCH, *Chairman.*
FRANK GERRETT.
CHARLES A. GLEASON.
GEORGE H. ELLIS.

[1] The president of the college is *ex officio* member and secretary of standing committees.

Committee on Horticulture.

WILFRID WHEELER, *Chairman.*
DAVIS R. DEWEY.
ELMER D. HOWE.
HAROLD L. FROST.

Committee on Experiment Department.[1]

CHARLES H. PRESTON, *Chairman.*
WILFRID WHEELER.
ARTHUR G. POLLARD.
CHARLES E. WARD.
HAROLD L. FROST.

Committee on Buildings and Arrangement of Grounds.

WILLIAM H. BOWKER, *Chairman.*
WILLIAM WHEELER.
FRANK GERRETT.
CHARLES H. PRESTON.
GEORGE P. O'DONNELL.

Committee on Extension Service.

ELMER D. HOWE, *Chairman.*
GEORGE H. ELLIS.
CHARLES E. WARD.
WILFRID WHEELER.
HAROLD L. FROST.

Examining Committee of Overseers from the State Board of Agriculture.

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FRANK P. NEWKIRK of Easthampton.
WILLIAM E. PATRICK of Warren.
JOHN J. ERWIN of Wayland.
R. HENRY RACE of North Egremont.

[1] The director of the experiment station is a member of the committee on experiment department, without vote.

Officers of the Institution.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

THE FACULTY.

Kenyon L. Butterfield,[1] A.M., LL.D., ... President's House.
President of the College and Head of Division of Rural Social Science.

George F. Mills, A.M., ... 46 Amity Street.
Dean of the College and Professor of Languages and Literature.

Charles H. Fernald, Ph.D., ... 3 Hallock Street.
Honorary Director of the Graduate School.

William P. Brooks, Ph.D., ... 5 Farview Way.
Director of the Experiment Station and Lecturer on Soil Fertility.

William D. Hurd, M.Agr., ... 82 Pleasant Street.
Director of the Extension Service.

Charles E. Marshall, Ph.D., ... Sunset Avenue.
Director of the Graduate School and Professor of Microbiology.

Frank A. Waugh, M.Sc., ... Campus.
Head of Division of Horticulture and Professor of Landscape Gardening.

James A. Foord, M.Sc.Agr., ... Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Administration.

Robert J. Sprague, Ph.D., ... Mount Pleasant.
Head of Division of the Humanities and Professor of Economics and Sociology.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Goessmann Professor of Chemistry.

Charles Wellington, Ph.D., ... 34 Amity Street.
Professor of Chemistry.

James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science.

George E. Stone, Ph.D., ... Mount Pleasant.
Professor of Botany.

Philip B. Hasbrouck, B.Sc., ... 130 Pleasant Street.
Professor of Physics and Registrar of the College.

John E. Ostrander, A.M., C.E., ... 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Professor of Entomology, Chairman of Division of Science.

George C. Martin, C.E., Captain 18th U. S. Infantry, ... Amherst House.
Professor of Military Science and Tactics.

—— ——[2] – –
Professor of Floriculture.

William R. Hart, A.M., L.B., ... 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears, M.Sc., ... Mount Pleasant.
Professor of Pomology.

Fred C. Kenney, ... Mount Pleasant.
Treasurer of the College.

[1] On leave of absence; Associate Dean Lewis serving as acting president.

[2] Position being filled temporarily by Mr. Edward J. Canning of Northampton.

JOSEPH S. CHAMBERLAIN, Ph.D., ... Mount Pleasant.
Professor of Organic and Agricultural Chemistry.
WILLIAM P. B. LOCKWOOD, M.Sc., ... 7 East Pleasant Street.
Professor of Dairying.
JOHN C. GRAHAM, B.Sc., ... Lincoln Avenue.
Professor of Poultry Husbandry.
EDWARD M. LEWIS, A.M., ... Lincoln Avenue and Gaylord Street.
Associate Dean of the College and Professor of Literature.
WILLIAM D. CLARK, A.B., M.F., ... 25 North Prospect Street.
Professor of Forestry.
SIDNEY B. HASKELL, B.Sc., ... 5 Fearing Street.
Associate Professor of Agronomy.
ROBERT W. NEAL,[1] A.M., ... — —
Associate Professor of English.
CLARENCE E. GORDON, Ph.D., ... 38 Lincoln Avenue.
Associate Professor of Zoölogy and Geology.
ALEXANDER E. CANCE, Ph.D., ... 9 Fearing Street.
Associate Professor of Agricultural Economics.
ELMER K. EYERLY, A.M., ... 52 Amity Street.
Associate Professor of Rural Sociology.
JOHN A. McLEAN, A.B., B.Sc.Agr., ... Lincoln Block.
Associate Professor of Animal Husbandry.
G. CHESTER CRAMPTON, Ph.D., ... 86 Pleasant Street.
Associate Professor of Entomology.
CHARLES A. PETERS, Ph.D., ... South Sunset Avenue.
Associate Professor of Inorganic and Soil Chemistry.
GEORGE E. GAGE, Ph.D., ... 27 Sunset Avenue.
Associate Professor of Animal Pathology.
A. VINCENT OSMUN, M.Sc., ... 5 Kendrick Place.
Assistant Professor of Botany.
EDGAR L. ASHLEY, A.M., ... Prospect House.
Assistant Professor of German.
ANDERSON A. MACKIMMIE, A.B., ... Pine Street, North Amherst.
Assistant Professor of French.
BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Assistant Professor of Beekeeping.
CURRY S. HICKS, B.Pd., ... 8 Allen Street.
Assistant Professor of Physical Education and Hygiene.
ARTHUR K. HARRISON, ... 8 Allen Street.
Assistant Professor of Landscape Gardening.
ERNEST ANDERSON, Ph.D., ... 17 Phillips Street.
Assistant Professor of General and Physical Chemistry.
HENRY E. SMITH, A.M., ... 24 Pleasant Street.
Assistant Professor of English.
WALTER W. CHENOWETH, A.B., M.Sc., ... North Amherst.
Assistant Professor of Pomology.
ELMER M. McDONALD, B.Sc., ... 24 Pleasant Street.
Assistant Professor of Agronomy.
F. H. HESSELINK VAN SUCHTELEN, Ph.D., ... 75 Pleasant Street.
Assistant Professor of Microbiology.
HAROLD E. ROBBINS, B.Sc., A.M., ... 12 Nutting Avenue.
Assistant Professor of Physics.
GEORGE N. HOLCOMB,[2] A.B., S.T.B., ... — —
Lecturer in History.
FRANK W. RANE, M.F., ... Boston.
Lecturer in Forestry.
CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.
C. ROBERT DUNCAN, B.Sc., ... 31 North Prospect Street.
Instructor in Mathematics.
WILLARD A. WATTLES, A.M., ... 24 Pleasant Street.
Instructor in English.

[1] On leave of absence. [2] Resigned, to take effect Nov. 1, 1913.

William L. Harmount, A.B., ... 86 Pleasant Street.
Instructor in French.
Elvin L. Quaife, B.Sc.Agr., ... 13 Fearing Street.
Instructor in Animal Husbandry.
William L. Machmer, A.M., M.E., ... 3 Kendrick Place.
Instructor in Mathematics.
Arthur N. Julian, A.B., ... Farview Way.
Instructor in German.
Walter E. Prince, Ph.B., A.M., ... 13 Spring Street.
Instructor in English and Public Speaking.
Adrian A. Brown, B.Sc., ... 24 Pleasant Street.
Instructor in Poultry Husbandry.
Samuel Coons, ... 56 Pleasant Street.
Buttermaker.
Bert C. Georgia, B.Sc., ... 24 Pleasant Street.
Instructor in Market Gardening.
Frank N. Blanchard, A.B., ... 9 Fearing Street.
Instructor in Zoölogy and Geology.
Miss Helena T. Goessmann, Ph.M., ... 40 Amity Street.
Assistant in English.
Frederick A. McLaughlin, B.Sc., ... Clark Hall.
Assistant in Botany.
Raymond G. Smith, B.Sc., ... Clark Hall.
Assistant in Botany.
Robert H. Bogue, B.Sc., ... Meadow Street, North Amherst.
Assistant in Chemistry.
William J. Fitzmaurice, ... – –
Assistant in Physical Education.
Harold M. Gore, B.Sc., ... 24 Pleasant Street.
Assistant in Physical Education.
Burt A. Hazeltine, B.Sc., ... 4 North Prospect Street.
Assistant in Mathematics.

Graduate Assistants.

Charles G. Baird, A.M., ... 9 Fearing Street.
Department of Agricultural Economics.
Henry L. Brown, B.Sc., ... 120 Pleasant Street.
Department of Chemistry.
Ernest L. Davies, B.Sc.Agr., ... 77 Pleasant Street.
Department of Microbiology.
G. Scott Fowler, B.Sc., ... 24 Pleasant Street.
Department of Chemistry.
Walter H. Hillary, B.Sc., ... Wilder Hall.
Department of Landscape Gardening.
Arao Itano, B.Sc., ... 75 Pleasant Street.
Department of Microbiology.
Russell F. Lund, A.B., ... Pine Heights.
Department of Agronomy.
James F. Martin, B.Sc., ... 19 South East Street.
Department of Entomology.
Harold A. Robinson, B.Sc., ... 6 Allen Street.
Department of Chemistry.
Paul Serex, Jr., B.Sc., ... Chemical Laboratory.
Department of Chemistry.
Carl J. Strand, A.M., ... 77 Pleasant Street.
Department of Rural Sociology.
Clark L. Thayer, B.Sc., ... 92 Pleasant Street.
Department of Floriculture.

Other College Officers.

Ralph J. Watts, B.Sc., ... 10 Nutting Avenue.
Secretary to the President.
Harold A. Crane, ... 4 Nutting Avenue.
Cashier.

Newton Wallace, ... Campus.
Electrician.
Percy C. Schroyer, ... 6 Phillips Street.
Assistant Engineer.
Clarence A. Jewett, ... 112 Pleasant Street.
Superintendent of Buildings.
James Whiting, ... 16 Hallock Street.
Foreman, Department of Floriculture.
John J. Lee, Sergeant, ... 9 Phillips Street.
Assistant to the Military Detail.
John J. Barber, ... Campus.
Farm Superintendent.
Lawrence S. Dickinson, B.Sc., ... Campus.
Foreman of Grounds.
John L. Byard, ... 21 Pleasant Street.
Superintendent of the Apiary.
William Chesley, ... Draper Hall.
Steward of the Dining Hall.
Miss Bertha E. Christiansen, A.B., ... 9 Phillips Street.
Assistant to the Dean.
Miss Lorian P. Jefferson, A.M., ... 84 Pleasant Street.
Expert Secretary, Division of Rural Social Science.
Miss Mary E. Caldwell, ... Draper Hall.
Bookkeeper.
Miss Henrietta L. Webster, ... Draper Hall.
Clerk, Treasurer's Office.
Miss Dorothy Mudge, ... Draper Hall.
Stenographer, Treasurer's Office.
Miss Lillian M. Gelinas, ... 79 Pleasant Street.
Stenographer, President's Office.
—— —— – –
Clerk, President's Office.
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Clerk, Department of Dairying.
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Clerk, Department of Farm Administration.
Miss Lina E. Fisher, ... 28 Pleasant Street.
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Miss Gladys E. Russell, A.B., ... Draper Hall.
Clerk, Division of Horticulture.
Miss Ada M. Chandler, A.B., ... 3 Fearing Street.
Cataloguing Clerk, Library.
Miss Marion Guertin, ... 5 East Pleasant Street.
Stenographer, Department of Entomology.
Miss Olive M. Turner, B.Sc., ... 22 Spaulding Street.
Clerk, Registrar's Office.
Miss Dorothy F. Smith, ... Draper Hall.
Clerk, Department of Floriculture.
Miss Lena Chapman, ... 6 Maple Avenue.
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Miss Nell C. Milton, ... Draper Hall.
Stenographer, Division of Rural Social Science.
Miss Clarissa G. Babcock, B.Sc., ... 9 Phillips Street.
Clerk, Library.
Miss Esther L. Houghton, A.B., ... 52 Pleasant Street.
Clerk, Department of Microbiology and Division of Agriculture.
Miss Rebecca L. Mellor,[1] 7 Northampton Road.
Clerk, Division of the Humanities.

[1] Half time.

THE EXPERIMENT STATION STAFF.

William P. Brooks, Ph.D., ... 5 Farview Way.
Director.
Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Vice-Director.
Fred C. Kenney, ... Mount Pleasant.
Treasurer.
Charles R. Green, B.Agr., ... Mount Pleasant.
Librarian.
Mrs. Lucia G. Church, ... 4 Hallock Street.
First Clerk, Office of the Director.
Miss Grace E. Gallond, ... 28 Pleasant Street.
Stenographer, Office of the Director.

Department of Plant and Animal Chemistry.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Chemist.
Edward B. Holland, M.Sc., ... 28 North Prospect Street.
Associate Chemist, in charge of Research Division.
Fred W. Morse, M.Sc., ... 40 Pleasant Street.
Research Chemist.
Henri D. Haskins, B.Sc., ... 14 Amity Street.
In charge of Fertilizer Division.
Philip H. Smith, M.Sc., ... 102 Main Street.
In charge of Feed and Dairy Division.
Lewell S. Walker, B.Sc., ... 19 Phillips Street.
Assistant.
Rudolph W. Ruprecht, B.Sc., ... 32 North Prospect Street.
Assistant.
Carleton P. Jones, M.Sc., ... 30 North Prospect Street.
Assistant.
Carlos L. Beals, B.Sc., ... 92 Pleasant Street.
Assistant.
Walter S. Frost, B.Sc., ... 4 North Prospect Street.
Assistant.
James P. Buckley, Jr., ... 29 Lincoln Avenue.
Assistant.
James T. Howard, ... North Amherst.
Collector.
Harry L. Allen, ... 89 Main Street.
Assistant.
James R. Alcock, ... Hatch Barn.
Assistant.
Miss F. Ethel Felton, A.B., ... 9 Phillips Street.
First Clerk.
Miss Alice M. Howard, ... North Amherst.
Clerk.
Miss Rebecca L. Mellor,[1] 7 Northampton Road.
Clerk.

Department of Agriculture.

William P. Brooks, Ph.D., ... 5 Farview Way.
Agriculturist.
Henry J. Franklin, Ph.D., ... Wareham.
In charge of Cranberry Investigation.
Edwin F. Gaskill, B.Sc., ... Pleasant Street.
Assistant Agriculturist.
Hubert D. Goodale, Ph.D., ... North Amherst.
Research Biologist in Poultry Husbandry.

[1] Half time.

John W. Sayer, ... Campus.
Foreman, Poultry Experimental Yards.
Miss Fay L. Milton, ... Draper Hall.
Clerk, Department of Poultry Husbandry.

Department of Horticulture.

Frank A. Waugh, M.Sc., ... Campus.
Horticulturist.
Fred C. Sears, M.Sc., ... Mount Pleasant.
Pomologist.
Jacob K. Shaw, Ph.D., ... 1 Allen Street.
Research Pomologist.
John B. Norton, B.Sc., ... 84 Pleasant Street.
Graduate Assistant.

Department of Botany and Vegetable Pathology.

George E. Stone, Ph.D., ... Mount Pleasant.
Botanist and Plant Pathologist.
George H. Chapman,[1] M.Sc., ... – –
Assistant Botanist.
Edward A. Larrabee, B.Sc., ... Clark Hall.
Assistant Botanist.
Miss Jessie V. Crocker, ... Sunderland.
Clerk.

Department of Entomology.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Entomologist.
Burton N. Gates, Ph.D., ... 42 Lincoln Avenue.
Apiarist.
Arthur I. Bourne, A.B., ... 12 East Pleasant Street.
Assistant in Entomology.
Miss Bridie E. O'Donnell, ... Hadley.
Clerk.

Department of Veterinary Science.

James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Veterinarian.

Department of Meteorology.

John E. Ostrander, A.M., C.E., ... 33 North Prospect Street.
Meteorologist.

THE EXTENSION SERVICE STAFF.

William D. Hurd, M.Agr., ... 82 Pleasant Street.
Director.
Earnest D. Waid, B.Sc.Agr., ... 61 Amity Street.
Assistant Director.
Orion A. Morton, ... Mount Pleasant.
Extension Professor of Agricultural Education.
Ezra L. Morgan, A.M., ... 2 Allen Street.
Community Field Agent.
Miss Laura Comstock, ... 84 Pleasant Street.
Extension Professor of Home Economics.
George F. E. Story, B.Sc.Agr., ... 10 Allen Street.
Extension Instructor in Dairying and Animal Husbandry.
Ralph W. Rees, A.B., B.Sc., ... 24 Pleasant Street.
Extension Instructor in Pomology.
Herbert J. Baker, B.Sc., ... 24 Pleasant Street.
Field Agent in Farm Management.
Philip H. Elwood, B.Sc.Agr., ... Lincoln Avenue.
Extension Instructor in Civic Improvement.

[1] On leave of absence; position filled temporarily by Mr. Orton L. Clark.

ERWIN H. FORBUSH, ... 8 Nutting Avenue.
Supervisor of Correspondence Courses.
ALLISTER F. McDOUGALL, B.Sc., ... – –
Demonstrator in charge of Automobile Truck.
LAWRENCE B. BOSTON,[1] Sandwich.
Agricultural Advisor, Barnstable County.
JOHN A. SCHEUERLE,[1] Springfield.
Secretary, Hampden County Improvement League.
Miss MABEL R. CASE, A.B., ... Draper Hall.
First Clerk.
Miss HANNAH M. GRIFFIN, A.B., ... Draper Hall.
Clerk.
Miss CORA B. GROVER, ... 4 Hallock Street.
Stenographer.
Miss MARION S. DONALDSON, B.Sc., ... Draper Hall.
Stenographer.
Miss INA M. PAIGE, ... Draper Hall.
Stenographer.

[1] Gives part-time service to the Massachusctts Agricultural College.

Standing Committees of the Faculty.[1]

1913-14.

Catalogue and Other Publications.

Associate Professor Eyerly.
Associate Professor Cance.
Assistant Professor Smith.

Commencement.

Professor Paige.
Professor Waugh.
The Commandant.
Associate Professor Peters.
Mr. Kenney.
Mr. Duncan.

Course of Study.

Professor Hart.
Professor Waugh.
Professor Foord.
Professor Sprague.
Professor Fernald.
Professor Ostrander.
Professor Chamberlain.

Discipline (Advisory).

Professor Mills.
Professor Hasbrouck.
Professor Lewis.
Captain Martin.
Associate Professor Gordon.
Assistant Professor Mackimmie.

Employment.

Professor Sears.
Mr. Kenney.
Associate Professor Haskell.

Entrance Examinations and Admission.

Professor Hasbrouck.
Professor Graham.
Assistant Professor Osmun.
Assistant Professor Ashley.
Mr. Machmer.
Mr. Wattles.

[1] The president of the college is ex officio member of each standing committee.

GRADUATE SCHOOL.

Professor MARSHALL.
Professor FERNALD.
Professor LINDSEY.
Professor PAIGE.
Professor STONE.
Professor SEARS.
Associate Professor GORDON.

LIBRARY.

Professor STONE.
Professor MARSHALL.
Professor WELLINGTON.
Associate Professor CANCE.

PHYSICAL EDUCATION AND ATHLETICS.[1]

No appointments for 1913–14.

SCHEDULE.

Professor LOCKWOOD.
Professor SPRAGUE.
Associate Professor PETERS.

SCHOLARSHIP.

Associate Professor GORDON.
Professor MILLS.
Professor HASBROUCK.
Professor LEWIS.
Assistant Professor MACKIMMIE.

STUDENT LIFE.

Director HURD.
Professor CHAMBERLAIN.
Professor LEWIS.
Associate Professor McLEAN.
Associate Professor HASKELL.
Assistant Professor MACKIMMIE.
Assistant Professor HICKS.

UNCLASSIFIED STUDENTS.

Professor LOCKWOOD.
Professor SEARS.
Associate Professor PETERS.

APPOINTED TO ATHLETIC BOARD.

Professor PAIGE.
Professor HASBROUCK.
Assistant Professor OSMUN.

[1] In lieu of this a committee on health and sanitation is appointed for one year, consisting of Professor Marshall, Mr. Kenney, Professor Lockwood, the Commandant, Miss Comstock and Assistant Professor Hicks.

The College.

Admission.

A. Application for Admission.

All correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege on or before June 1 of the year in which examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. Modes of Admission.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

Certificates. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England will be received if those schools are on the approved list of the College Entrance Certificate Board of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates must present not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

Examinations. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.[1]

[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units of the preparatory subjects, applicants may be admitted and upon examination, with a condition in English, provided that they show, upon examination, satisfactory preparation in work entitling them to a ranking of 60 or higher.

Students so admitted, must, to remove the condition, pass an examination covering the regular three-units requirement.

Places of Examination. — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst in the building of the Department of Physics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall.

In September, examinations will be held in Amherst only.

Schedule for Entrance Examinations, June 18–20, inclusive, 1914. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M. Registration.[1]
8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Algebra.
3.30 P.M. Physics.

Second Day.

8.00 A.M. Required English.
11.00 A.M. Solid geometry.
2.00 P.M. History, required and elective.

Third Day.

8.00 A.M. French, German, required and elective.
1.00 P.M. Latin A and B and all one-half electives point, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1914, the examinations will be given September 2–5, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M. Registration.
1.15–5.00 P.M. Greek A and B.

Second Day.

8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Algebra.
3.30 P.M. Physics.
4.30 P.M. Elective English.

Third Day.

8.00 A.M. Required English.
11.00 A.M. Solid geometry, agriculture.
2.00 P.M. History, required and elective.

Fourth Day.

8.00 A.M. French, German, required and elective.
1.00 P.M. Latin A and B and all one-half credit electives, except those already noted.

C. Requirements for Admission.

The requirements for admission are based on the completion of a four-years' course in a high school, or its equivalent, and are stated in terms of units. The term unit means the equivalent of four or five recitations a week for a school year. **Neither more nor less credit will be given in any sub-**

[1] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

ject than is indicated in the table below. Fourteen units must be offered for admission. In the list given below, *every subject in black-faced type is absolutely required and no substitution is allowed.* The subjects so typed total eight and one-half units. In addition to these points five and one-half more units must be chosen from the subjects printed in light-faced type.

Agriculture,[1]	½ or 1
Botany,[2]	½ or 1
Chemistry,[2]	1
Algebra,	1½
Plane geometry,	1
Solid geometry,	½
Trigonometry,	½
Physics,[2]	1
Geology,[2]	½
Physiography,	½
Physiology,	½
Zoölogy,[2]	½
History[3] (Ancient; Medieval and Modern; English; General; United States and Civics), *any one*,	1[4]
English,	3
English (elective),[1]	1
Modern Language (elementary French or elementary German),	2
Elementary French,[5]	2
Elementary German,[5]	2
Intermediate French,	1
Advanced French,	1
Intermediate German,	1
Advanced German,	1
Greek A,[1]	2
Greek B,[1]	2
Latin A,	2
Latin B,	2
Commercial geography,[6]	½
Drawing,[6]	½
Manual training,[6]	½ or 1

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, page 25).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificate should not present note-books; but their certificates must state that note-books have been satisfactorily completed.

D. Statement of Preparation required for Admission.

In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address substation 84, New York City.

Agriculture. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and

[1] Examination in September only.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] One must be offered for the required point, one, two or three others may be offered for elective points.

[4] For each offered.

[5] May be offered as elective if not offered to satisfy *required* points.

[6] On certificate only, no examination given.

of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade. **The examination in agriculture will be given in September only.**

Botany. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Steven's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

Mathematics. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the

principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

Physics. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Text-book of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

Physiology. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body: Briefer Course."

Zoölogy, Physiography, Geology. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

History. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

English. — For 1914: —

English Grammar and Composition. — Command of correct and clear English (spoken or written) requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

Literature. — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(*a*) Reading: The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of group I. a unit from any other group may be substituted.

II. Shakspere's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dicken's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(*b*) Study: This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and an essay, as follows: —

Shakspere's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

Examination. — However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development, and other qualities of style and treatment, as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may

be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

The second part of the examination will include composition and those books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

English, Elective.[1] — To secure a fourth entrance credit in English, the applicant should do (*a*) the full equivalent of three years' work (required English), and also (*b*) the full equivalent of a fourth year's work. Applicants not certified with a fourth entrance credit will be examined, provided that the applicant, on or before June 1, notify the Department of English of his intention to take the examination, and supply thereafter the information needed by the department to prepare the examination questions. The information blanks will be forwarded by the Department of English upon receipt of the notice.

Subjects accepted. — The applicant may offer (*a*) any one of the subjects stated hereunder, or (*b*) any two of these subjects in combination.

(*a*) History of American literature.
(*b*) History of English literature (or lives of the great authors).
(*c*) Classics *other than those read to meet the three-credit requirement.*
(*d*) Advanced composition.
(*e*) History of the English language.
(*f*) Advanced high school grammar.

Advanced Standing in College. — Whether advanced standing shall be given applicants entering with a fourth credit in English will be determined by consideration of each case individually. Much weight is given to the ability of the student to express himself correctly and clearly, to think clearly, and to grasp the meaning of printed language. A special examination will be given in the opening week of college, notice of which will be posted on the English bulletin board, for freshmen who wish to apply for advanced standing.

Presentation of Note-books and Themes. — Applicants for examination, either for fourth-unit credit or for advanced standing, are advised to present the note-books, themes, etc., prepared by them in the preparatory school, as an aid toward determining their proficiency.

English. — For 1915–19 inclusive: —

The National Conference on Uniform Entrance Requirements in English voted that the following be the requirements for the years 1915, 1916, 1917, 1918 and 1919.

[1] **Examination given in September only.**

This supersedes the previously announced requirement for 1915.

The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

Grammar and Composition. — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

Literature. — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. Reading. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I.: —

Group I. Classics in Translation: The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any selection from group I. a selection from any other group may be substituted.

Group II. Shakspere: "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"[1] "Macbeth;"[1] "Hamlet."[1]

Group III. Prose Fiction: Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voy-

[1] If not chosen for study under B.

ages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one;* Jane Austen's novels, any *one;* Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens's novels, any *one;* Thackeray's novels, any *one;* George Eliot's novels, any *one;* Mrs. Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reade's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevenson's "Treasure Island" or "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one;* Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables" or "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

Group IV. Essays, Biography, etc.: Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tatler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" selections from Irving's "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" selections from Lamb's "Essays of Elia" (about 100 pages); selections from Lockhart's "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison and Steele in the English Humorists;" Macaulay: any one of the following essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay;" selections from Trevelyan's "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years before the Mast;" Lincoln's "Selections," including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address, the letter to Horace Greeley, together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson and later writers; a collection of "Letters" by various standard writers.

Group V. Poetry: Palgrave's "Golden Treasury" (first series), books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury" (first series), book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens" and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake," or "Marmion;" Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The Armada," "Ivry;" Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last

Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum" and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

B. Study. — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. Drama: Shakspere's "Julius Cæsar," "Macbeth," "Hamlet."

Group II. Poetry: Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

Group III. Oratory: Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

Group IV. Essays: Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading. For this purpose the examiner will provide several subjects, perhaps eight or ten, from which the candidate may make his own selections. He will not be expected to write more than four hundred words per hour.

The examination in literature will include: —

(*a*) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above. The candidate will be required to submit a list of the books read in preparation for the examination, certified by the principal of the school in which he was prepared; but this list will not be made the basis of detailed questions.

(*b*) A test on the books prescribed for study, which will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

The Massachusetts Agricultural College calls attention to the following recommendations of the national conference, which agree with its policy: —

1. That colleges so desiring may set an examination requiring no prescribed books, but testing the same general kind of preparation as that indicated in the foregoing requirements.

2. That individual colleges take such steps as may be found necessary to ascertain whether candidates for entrance possess an adequate equipment in oral English.

As rapidly as seems expedient the college will proceed in accordance with these recommendations. Schools wishing to present candidates prepared in conformity to the intent of the recommendations will have the co-operation of the college.

French. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

German. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

Greek. — Greek will receive credit as an elective requirement upon either examination or certification, as follows (**examination in September only**): —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

B. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

Latin. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

B. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

Commercial Geography.[1] — Preparation should be made in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

Drawing.[1] — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see "Manual Training."

Manual Training.[1] — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

E. Admission to Advanced Standing.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. Other Information about Entrance.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted.
4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination, in the week following

[1] On certificate only.

the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

G. Unclassified Students.

All requests for information concerning admission of unclassified students should be addressed to Professor W. P. B. Lockwood, chairman of committee on unclassified students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years' high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

9. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

10. No unclassified student shall be allowed to participate in any intercollegiate contests.

Courses of Instruction.

A. TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

The figures indicate the number of credit hours a week. For details, see the descriptions of courses.

Freshman Year.

First Semester.

Subjects. All work required.	Hours per Week.
Chemistry,	3
Algebra,	3
Solid Geometry,[1]	2
English,	4
Public Speaking (at option of instructor),	1
French or German,[2]	4
Drill,	½
Hygiene,	1
College Life (attendance without credit).	
	18 or 19

Second Semester.

Subjects. All work required.	Hours per Week.
Animal Husbandry,	2
Chemistry,	3
Trigonometry,	3
Algebra,	2
English,	4
Public Speaking (if not taken in semester one),	1
French or German,	4
Drill,	1
Physical Education,	1
	20 or 21

Sophomore Year.

First Semester.

Subjects. All work required.	Hours per Week.
Agronomy,	3
Physics,	5
Zoölogy,	3
English,	2
French or German,	3
Tactics,	1
Drill,	1
Chemistry or Animal Husbandry (elective),	3
	21

[1] To be taken in course when not offered for entrance.

[2] Students who have had three or four years of one language in the preparatory school will elect the other language. Students who have had two years of one language may have their choice of election. Whichever language they so elect must be continued to the end of the first semester of the sophomore year. Eleven college credits are required in this language.

Second Semester.

All courses under "Required," with any two of those under "Elective."

Subjects. Required.	Hours per Week.
Elementary Horticulture,	2
Botany,	4
English,	2
Agricultural Industry,	3
Drill,	1
Tactics,	1
Physical Education,	1
	14

Elective.

French or German, Geology, Physics, Chemistry, Surveying,	Each 3 hours.	Any two,	6
			20

B. MAJORS: JUNIOR AND SENIOR YEARS.

General Statement.

A major consists of 30 hours of correlated work, to be arranged by the student and an instructor called the adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

Rules.

Rule 1. *Election.* — Each student, in the second semester of his sophomore year, shall elect a major subject from the list of majors given below; and this major shall consist of 30 credit hours of correlated work.

Rule 2. *Minimum Credits.* — The minimum number of credits for the junior and senior years shall be 65, inclusive of Military Drill and Physical Education.

Rule 3. *Maximum Credits.* — The maximum number of credits for any semester of the junior or senior year shall be 21.

Rule 4. *Humanities and Rural Social Science.* — A minimum of 15 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 3 credit hours will be required in each of the Divisions.

Rule 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 30 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

Rule 6. *Free Electives.* — Each student is required to take 30 hours in his major and also 15 hours in the Divisions of the Humanities and Rural Social Science, making a total of 45 hours. He is allowed free choice of courses to complete his required hours, this remainder amounting to 15 hours minimum, or 35 hours maximum for the two years.

Rule 7. *Registration.* — No upper classman shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office on June 1.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the year and countersign the card.

(3) Each course card must be filled out, giving the name of student, his college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours of free elections added by the student, the card must be returned to the registrar not later than June 10.

Rule 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by the committee on scholarship, they become operative at the beginning of the semester following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

LIST OF MAJORS.

Agriculture.

Professor James A. Foord, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 6,	3
Animal Husbandry 3,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Dairying 1,	3
Dairying 2,	3
Farm Administration 3,	3
Farm Administration 4,	3
Microbiology 1 and 2,	5
	32

Chemistry 7 and 8, Veterinary Science 1, Microbiology 2, Pomology 1 and Animal Husbandry 6 are suggested as additional courses for the student fitting himself for general agriculture.

Agronomy.

Associate Professor Sidney B. Haskell, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 4,	3
Agronomy 5,	3
Agronomy 6,	3
Agronomy 8,	3
Animal Husbandry 9,	3
Farm Administration 4,	3
Chemistry 5,	5
Chemistry 6,	5
	31

Animal Husbandry.

Associate Professor J. Allan McLean, Adviser.

Course.	Credit.
Agronomy 3,	3
Veterinary Science 1, Veterinary Hygiene and Stable Sanitation,	3
Veterinary Science 2, General Veterinary Pathology (Materia Medica and Therapeutics),	3
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 10,	3
Animal Husbandry 11,	2
Dairying 1,	3
Farm Administration 3,	3
Farm Administration 4,	3
	32

Dairying.

Professor William P. B. Lockwood, Adviser.

Course.	Credit.
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 11,	2
Dairying 1,	3
Dairying 2,	3
Dairying 3,	3
Microbiology 11 and 12,	3
Farm Administration 3,	3
Farm Administration 4,	3
	29

Poultry Husbandry.

Professor John C. Graham, Adviser.

Course.	Credit.
Poultry Husbandry 1,	2
Poultry Husbandry 2,	2
Poultry Husbandry 3,	1
Poultry Husbandry 4,	1-3
Poultry Husbandry 5,	1
Poultry Husbandry 6,	3
Poultry Husbandry 7,	3
Poultry Husbandry 9,	3
Pomology 1,	3
Agronomy 3,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Veterinary Science 7,	3
	31-33

Floriculture.

Professor —— ——. Adviser.

Course.	Credit.
Floriculture 1,	4
Floriculture 2,	4
Floriculture 3,	3
Floriculture 4,	3
Horticulture 3,	3
Horticulture 4,	3
Entomology 1,	3
Market Gardening 2,	3
Botany 2,	4
	30

Note. — Horticulture 3 and 4 is a junior subject, but to balance the work for the two years it would be better for the floricultural students to take the course in the senior year.

Forestry.

Professor WILLIAM D. CLARK, Adviser.

Course.	Credit.
Forestry 3,	3
Forestry 4,	3
Forestry 5,	5
Forestry 6,	3
Entomology 5,	3
Landscape Gardening 1,	3
Horticulture 3,	3
Horticulture 4,	3
Botany 13,	4
	30

Students who propose to major in forestry should elect geology and surveying in sophomore year.

Landscape Gardening.

Professor FRANK A. WAUGH, Adviser.

Course.	Credit.
Landscape Gardening 1,	3
Landscape Gardening 2,	3
Landscape Gardening 3,	3
Landscape Gardening 4,	3
Landscape Gardening 5,	2
Landscape Gardening 6 or 10,	2
Landscape Gardening 7,	3
Landscape Gardening 8,	3
Drawing 1,	3
Drawing 2,	3
Horticulture 3,	3
	31

Courses for juniors *only:* Landscape Gardening 1 and 2, Drawing 1 and 2.
Courses for seniors and graduates *only:* Landscape Gardening 3, 4, 7 and 8.
Courses open to juniors and seniors, both if possible: Horticulture 3 and 4.
This grouping of subjects is offered only as an example. Other groupings may be approved by the adviser, but such other groupings must be subject to the class schedule.

Pomology.

Professor FRED C. SEARS, Adviser.

Course.	Credit.
Pomology 1,	3
Pomology 2,	3
Pomology 3,	3
Pomology 4,	3
Pomology 6,	2
Botany 5,	2
Agronomy 5,	3
Entomology 1,	3
Entomology 2,	3
	25

Agricultural Chemistry.

Associate Professor Charles A. Peters, Adviser.

Course.	Credit.
Chemistry 5,	5
Chemistry 6,	5
Chemistry 9,	5
Chemistry 10,	5
Chemistry 11,	5
Chemistry 12, 14 or 16,	5
Chemistry 13,	3
Chemistry 15,	3
Chemistry 18,	2
	38

The major will consist of 30 credit hours selected from this list. The student will be advised concerning other subjects suitable to be taken in connection with Chemistry.

Economic Entomology.

Professor Henry T. Fernald, Adviser.

Course.	Credit.
Entomology 1,	3
Entomology 2,	2
Entomology 3,	4
Entomology 4,	4
Entomology 5,	3
Entomology 8,	3
Botany 3,	4
Botany 4,	2
Zoölogy 3,	3
Zoölogy 4,	3
	31

A major in Economic Entomology does not necessarily include all the subjects given in this list, but may be varied to some extent, in accordance with the future plans of the student, other modifications being permissible.

Rural Social Science.

Dr. Alexander E. Cance, Associate Professor E. K. Eyerly, Advisers.

Course.	Credit.
Economics and Sociology 1,	3
Agricultural Economics 3,	3
Agricultural Economics 7,	3
Agricultural Economics 6 or 8,	3
Rural Sociology 2,	3
Rural Sociology 4,	1
Rural Sociology 5 or 7,	3
Rural Sociology 8,	3
Rural Sociology 10,	3
Rural Sociology 11,	3
Farm Administration 4,	3
	31

Microbiology.

Dr. Chas. E. Marshall, Adviser.

Course.	Credit.
Microbiology 1 and 2,	5
Microbiology 3 and 4,	5
Microbiology 5 and 6,	3
Microbiology 7 and 8,	3
Chemistry 3,	5
Chemistry 4,	5
Chemistry 5,	3
Chemistry 6,	3
	32

Courses 9 in Chemistry; 3, 4, 5 in Botany; 3, 4, 5, 6 in Zoölogy; 1, 3, 5, 6 in Veterinary Science, together with German and French, are suggested as collateral lines. Dairying 1 and Agronomy 5 are essential to a grasp of the larger problems involved in Microbiology as applied to Agriculture.

Plant Physiology and Pathology.

Professor George E. Stone, Adviser.

Course.	Credit.
Botany 3,	4
Botany 4,	2
Botany 10,	4 or 5
Botany 14,	4
Botany 11,	5
Chemistry 5,	5
Chemistry 6,	5
Entomology 1,	3
Entomology 2,	2
	34 or 35

Agricultural Education.

Professor William R. Hart, Adviser.

Course.	Credit.
Agricultural Education 1,	3
Agricultural Education 2,	3
Agricultural Education 3,	3
Agricultural Education 4,	3
Agronomy 3,	3
Dairying 5,	2
Farm Administration 3,	3
Poultry Husbandry 1,	2
Market Gardening 2, / Agronomy 5,	3
Botany 5,	2
Pomology 1,	3
	30

Some substitutions of other technical courses for some of the technical courses above mentioned will be made to meet the needs of individual students.

Summary.

There are four preliminary steps which a student should take in arranging for his major work.

1. Select a major.

2. Confer with major adviser for arrangement of courses, the plan to be approved by adviser in accordance with Rule 5 previously stated.

3. Select courses covering the four semesters of the junior and senior years in such a way that a minimum of 15 credits will be taken in the two Divisions, the Humanities and Rural Social Science; the distribution of all but 3 of these credits may be decided by the student.

4. Choose other courses so that the total number of credits for any semester shall be not less than 16 nor more than 21. (See Rules 2 and 3.)

C. UNDERGRADUATE COURSES.

All courses given in the *first semester bear odd numbers;* all given in the *second semester bear even numbers.* Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of the Book of Rules.

DIVISION OF AGRICULTURE.

Professor Foord.

AGRONOMY.

Associate Professor Haskell, Dr. Brooks, Assistant Professor McDonald, Mr. Lund.

Required Course.

1. Soils and Fertilizers. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 hours. Credit, 3.

Associate Professor Haskell and Assistant Professor McDonald.

Elective Courses.

3. Field and Forage Crops. — History, classification, cultivation, harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage and root crops suitable to New England conditions. The work includes lecture, laboratory and field study of these various crops. Prerequisites, Agronomy 1 and Botany 2. For juniors primarily; 1 lecture and 2 laboratory periods. Credit, 3.

Assistant Professor McDonald.

4. Advanced Field Crops. — Commercial production of grain, hay and root crops. Lecture, laboratory, and field study of the purity, quality, and vitality of the seed of these crops and the handling, grading and judging of their products. The work offered will not be confined to New England conditions. Prerequisite, Agronomy 3. For juniors primarily; 2 lectures and 1 laboratory period. Credit 3. Assistant Professor McDonald.

5. Advanced Soils. — A field, laboratory and lecture course on soils, their nature, composition, physical qualities, improvement. Field work, as far as the season allows, consists of detailed soil surveys in different parts of the Connecticut valley; this followed by laboratory work on the physical properties of the soil collected, on the effect of fertilizers on the soil, and on the mixing of fertilizers. Prerequisite, Agronomy 1. For seniors primarily; 1 lecture period and 1 4-hour laboratory period weekly. Credit, 3.

Associate Professor Haskell.

6. Drainage and Irrigation. — A field and lecture course on soil improvement, by drainage and irrigation. As a thesis each man is required, after studying an area of wet or swampy land, to present plans and estimates for its reclamation. Prerequisites, Agronomy 1 and Mathematics 6. Juniors and seniors; 1 lecture period and 1 4-hour laboratory period weekly. Credit 3.

Associate Professor Haskell.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. This course is intended for seniors only. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3.

Dr. Brooks.

ANIMAL HUSBANDRY.

Associate Professor McLean, Mr. Quaife.

Required Course.

2. Market Classes and Grades of Live Stock. — A study of the different market classes and grades of horses, cattle, sheep and swine. The purpose of this course is to familiarize beginners with the different classes of stock, and to give them a grounding in live stock judging. Text-book, Craig's "Live Stock Judging." Freshmen; 2 laboratory periods. Credit, 2.

Associate Professor McLean and Mr. Quaife.

Elective Courses.

3. Breeds and Types of Live Stock. — A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Text-book, Plumb's "Breeds and Types of Farm Animals." Prerequisite, Animal Husbandry 2. Sophomores; 1 lecture and 2 laboratory periods. Credit, 3.

Associate Professor McLean and Mr. Quaife.

5. Principles of Breeding. — This course is designed to familiarize the student with the problems involved in animal and plant improvement; to acquaint him with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; De Vrie's theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live stock improvement. Text, "Genetics," by Herbert E. Walter. Supplementary reading. Prerequisite, Zoölogy 1; 3 lectures. Credit, 3.

Associate Professor McLean.

6. Live-stock Management. — The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, breaking to drive, driving, harnessing, casting and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work. Prerequisite, Animal Husbandry 3. Juniors; 1 laboratory period. Credit, 1. Mr. Quaife.

8. Advanced Stock Judging. — This course is designed to equip Animal Husbandry students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits will be made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected largely from this class. Prerequisite, Animal Husbandry 3. Juniors; 2 laboratory periods. Credit, 2. Associate Professor McLean.

9. Feeding and Management. — A study of the principles of animal nutrition; of the composition and qualities of feeding materials; of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production. Text-book, Henry's "Feeds and Feeding." Prerequisite, Chemistry 5 or 7. Seniors; 3 lectures. Credit, 3.
Mr. Quaife.

10. Feeding and Management. — A continuation of Course 9, dealing in a similar manner with horses, sheep, beef cattle and swine. Prerequisite, Course 9. Seniors; 3 lectures. Credit, 2. Mr. Quaife.

11. Herd and Stud-book Study. — An advanced course in the study of the breeds of live stock, familiarizing the student with the detailed history of the breed, the most productive sires and dams of the various breeds, and the successful lines and methods of breeding. Prerequisites, Animal Husbandry 5 and 8. Seniors; 2 hours. Credit, 2. Associate Professor McLean.

DAIRYING.

Professor Lockwood, Mr. Story, Mr. Coons.

Elective Courses.

1. Milk and Milk Composition. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems. Two lecture hours and 1 2-hour laboratory period. Credit, 3.
Professor Lockwood.

2. Buttermaking. — A study of separators and cream separation; handling milk and cream for buttermaking; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof. Prerequisite, Course 1; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Professor Lockwood and Mr. Coons.

3. Market Milk and Milk Products. — A study of market milk conditions, extent and development of the business; supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection. The manufacture of milk products other than butter, including cheese, condensed milk, cottage cheese, casein, milk powder, ice cream, etc. Prerequisites, Dairying 1, and Bacteriology 1; 2 lecture hours and 1 2-hour laboratory period. Credit, 3. Professor Lockwood.

4. Dairying. — A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary buttermaking; proper methods of handling milk and cream; and the relation of market milk to the public health. One lecture hour and 2 2-hour laboratory periods. Credit, 3.
Professor Lockwood.

FARM ADMINISTRATION.

Professor Foord.

Elective Courses.

3. Farm Buildings and Machinery. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisites, Agronomy 1, Animal Husbandry 2, Physics 1. Primarily for seniors; 2 laboratory periods and 1 lecture hour. Credit, 3.
Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3, Animal Husbandry 2 and 3. Primarily for seniors; 2 lecture or recitation hours and 1 laboratory period. Credit, 3. Professor Foord.

POULTRY HUSBANDRY.

Professor Graham, Mr. Brown.

Elective Courses.

1. Elements of Poultry Culture. — This course consists of a comprehensive study of poultry-house construction, poultry-house equipment, winter-egg production, types and breeds of poultry. Juniors; 2 lectures. Credit, 2.
Professor Graham.

2. Elements of Poultry Culture. — This is a continuation of Course 1, treating the subjects of incubation, brooding, care of growing stock, market poultry, including capons, roasters and broilers, and diseases of poultry. Juniors; 2 lectures. Credit, 2. Professor Graham.

3. Poultry Practice Work. — This is a practical laboratory course in poultry carpentry, caponizing, killing and picking; dressing and packing poultry, sorting and preparing eggs for market. Must be preceded or accompanied by Course 1. Juniors; 1 laboratory period. Credit, 1.

Mr. Brown.

4. Incubation and Brooding. — In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg, and the care of sitting hens. This course must be preceded or accompanied by Course 2. Juniors; time to be arranged. Credit, 1 to 3. Mr. Brown.

5. Pen Management. — This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls, and profit and loss; must be preceded or accompanied by Course 1. Juniors; time to be arranged. Credit, 1. Mr. Brown.

6. Poultry Management. — In this course a detailed study of large poultry farms and equipment, such as bone cutters, feed cutters, cramming machines, etc., will be carried on. It includes the laying out and planning of poultry buildings of all kinds, the mating of fowls, and the preparing of birds for exhibition. Attention to poultry diseases and investigation work carried on by experiment stations is prominent in this course. A few good poultry plants will be visited by the class for practical demonstrations. Prerequisites, Courses 1, 2, 3 and 4. Seniors; 2 lectures, 1 laboratory period. Credit, 3. Professor Graham and Mr. Brown.

7. Advanced Poultry Judging. — This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text. Prerequisites, Courses 1, 2, 3, 4 and 5. Seniors; 1 lecture and 2 laboratory periods. Credit, 3. Mr. Brown.

9. Market Poultry and Poultry Products. — This course includes the study of market classifications of poultry, eggs and feathers; the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course. Prerequisites, Courses 1, 2 and 3. Seniors; 1 lecture or conference period and laboratory periods to be arranged. Credit, 3.

Mr. Brown.

DIVISION OF HORTICULTURE.

Professor Waugh.

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, forestry, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.]

2. Nursery Practice. — This course treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums. Sophomores, 1 lecture period and 1 laboratory period. Credit, 2. Assistant Professor Chenoweth.

Elective Courses (General).

3. Plant Materials. — This course aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3.

4. Plant Materials. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Prerequisite, Horticulture 3; 2 lecture periods and 1 laboratory period. Credit, 3.

6. Plant Breeding. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 2-hour laboratory period. [Not given in 1914–15.] Credit, 3.

FLORICULTURE.

Elective Courses.

1. Greenhouse Management. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of glazing concrete, bench construction, bulb culture, greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants by seeds and cuttings. This is designed as a laboratory course,

and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4.

2. Greenhouse Management. — A continuation of Course 1, including also a study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimate of comparative cost of different methods of construction; drafting specifications. Design making and table decorations are considered in this course. Juniors; prerequisite, Floriculture 1; 7 hours as stated under Course 1. Credit, 4.

3. Fall Greenhouse Crops. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms and various conservatory plants; the importation, purchase and growth of bulbous material; the preparation of material for forcing; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3.

4. Spring Greenhouse Crops. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3.

MICROBIOLOGY.

Dr. Marshall, Dr. van Suchtelen, Mr. Itano, ————.

Elective Courses.

1, 2. Morphological, Cultural and Physiological Microbiology. — Types of micro-organisms, technic of handling, methods of culture and functions of micro-organisms are considered. This course is elementary and fundamental to all applied and special microbiological studies, and therefore is made a prerequisite to all courses offered; 2 hours or 2 credits are assigned to lectures, text-book requirements and recitations; this time will be scheduled. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled, the remaining 5 hours are arranged with the instructor. Total, 5 credits. Open to juniors and seniors during the fall and spring semesters.

3, 4. Agricultural Microbiology. — This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices. These subjects will be demonstrated by illustrative and typical laboratory exercises, which for each subject, on account of time limitations, must be very elementary and greatly restricted. Prerequisite,

Microbiology 1 and 2. Two hours or 2 credits are assigned to lectures, text-book requirements and recitations; this time will be scheduled. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Total, 5 credits. Open to juniors and seniors during the fall and spring semesters.

Note. — Courses 1 and 2 are especially adapted to those who wish a general, comprehensive, although elementary, survey of Agricultural Microbiology.

5, 6. Advanced Morphological, Cultural and Physiological Microbiology. — The purpose of this course is to prepare the student for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technic and methods of culture, together with a more extensive knowledge of micro-organisms and their functions. Prerequisites, Microbiology 1 and 2, 3 and 4; Chemistry 5 and 6. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Total, 3 credits. Open to juniors and seniors in the fall and spring semesters.

7, 8. Advanced Agricultural Microbiology. — A knowledge of the subjects mentioned in Courses 3 and 4 cannot be obtained without a more extensive training in microbiological practices, as found in Courses 5 and 6. With this it is possible to continue the work of Course 2. Prerequisites, Microbiology 1 and 2 and 3 and 4, 5 and 6; Chemistry 5 and 6. Six hours or 3 credits are assigned to the laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Total, 3 credits. Open to juniors and seniors in the fall and spring semesters.

9, 10. Soil Microbiology. — Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention. Prerequisite, Microbiology 1 and 2. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors during the fall and spring semesters.

11, 12. Dairy Microbiology. — Special emphasis will be placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk; bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered. Prerequisite, Microbiology 1 and 2, and Dairying 1. Six hours or 3 credits are assigned to labora-

tory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors during the fall and spring semesters. (See Dairying 3.)

13, 14. Food Microbiology. — A study of food preservation by means of drying, canning, refrigerating and addition of chemicals will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased foods, will receive consideration. Contamination of food supplies by means of water, handling, exposure, diseased persons, etc., is of especial significance and will be demonstrated by laboratory exercises. Prerequisite, Microbiology 1 and 2. Six hours or 3 credits are assigned to laboratory exercises; only 1 of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors during the fall and spring semesters.

15, 16. Hygienic Microbiology. — An attempt will be made to select for this course certain material which should be the possession of every individual, and which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antisepsis and asepsis will be treated. Prerequisite, Microbiology 1 and 2. Six hours or 3 credits are assigned to laboratory exercises; only 1 of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors during the fall and spring semesters.

FORESTRY.

Professor Clark.

Elective Courses.

1. Principles of Forestry. — A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Two lectures; juniors and seniors; not required of students who propose to major in forestry. Credit, 2. Professor Clark.

3. Dendrology. — During the first part of the semester frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Two 2-hour periods; lectures, recitations, laboratory or field work at option of instructor; juniors. Credit, 3. Professor Clark.

4. Silviculture. — Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting. Three lectures weekly until May 1; during May and June, 1 lecture and 1 4-hour field period weekly; juniors. Prerequisite, Forestry 3. Credit, 3. Professor Clark.

5. Forest Mensuration. — Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating. Three lectures; 72 hours of field work; seniors. Credit, 5. Professor Clark.

6. Forest Valuation and Regulation. — Methods of determining the costs of growing timber crops and of arriving at the value of future growth or standing immature growth. Methods of regulating the harvest of crops so as to secure a sustained or annual yield. Prerequisite, Forestry 5; seniors; 3 lectures. Credit, 3. Professor Clark.

LANDSCAPE GARDENING.

Professor Waugh, Assistant Professor Harrison.

Elective Courses.

1. Elements of Landscape Gardening. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 6 hours a week. Credit, 3.
Assistant Professor Harrison.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1.

3. General Design. — Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 6 hours. Credit, 3. Assistant Professor Harrison.

4. General Design. — As stated under Course 3. Prerequisite, Course 3.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2. Professor Waugh.

6. Architecture. — The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, peratice in designing; 2 hours. Credit, 2. (Alternating with Course 10 and not to be given in 1913–14.)
Assistant Professor Harrison.

7. Civic Art. — The principles and applications of modern civic art, including city design, city improvement, village improvement and rural improvement. Prerequisites, Courses 1, 2 and 3; must be followed by Course 8; 6 hours. Credit, 3. Professor Waugh.

8. Civic Art. — As stated under Course 7. Prerequisite, Course 7.

10. Construction and Maintenance. — Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc. Two hours. Credit, 2. (Alternating with Course 6.) Assistant Professor Harrison.

MARKET GARDENING.

Mr. Georgia.

Elective Courses.

2. Elements of Market Gardening. — A course designed for an introduction to market gardening as a business. The work consists primarily of actual field experience in handling vegetable crops from seed to maturity. This is supplemented with lectures and text-book, in which a study of methods, soils, fertilization, tillage and management is made. Juniors; 5 hours. Credit 3. Mr. Georgia.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3. Mr. Georgia.

POMOLOGY.

Professor Sears, Mr. Chenoweth, Mr. Rees.

Elective Courses.

1. Practical Pomology. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery stock, pruning, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 4 hours. Credit, 3. Professor Sears.

2. Practical Pomology. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 4 hours. Credit, 3. Professor Sears.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 4 hours. Credit, 3. Professor Chenoweth.

4. Commercial Pomology. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 4 hours. Credit, 3. Professor Chenoweth.

6. Spraying. — A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small fruit plantations. Prerequisites, Horticulture 2, Pomology 1 and 2. Seniors; 3 hours (1 lecture period and 1 laboratory period). Credit, 2. Professor Sears.

DRAWING.

Mr. Hillary.

Elective Courses.

1. Freehand Drawing. — Lettering; freehand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink. Juniors; 6 hours. Credit, 3.

Mr. Hillary.

2. Mechanical Drawing. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry. Juniors; 6 hours. Credit 3.

Mr. Hillary.

DIVISION OF SCIENCE.

Professor Paige.

BOTANY.

Professor Stone, Assistant Professor Osmun, Mr. McLaughlin, Mr. Smith.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

Required Course.

2. General Botany. — The morphology, physiology and classification of plants. This course is fundamental. Its aim is to lay a foundation for the more specialized courses in botany which follow and to provide a general knowledge of the science for those students who will not take further work in the department. This course is prerequisite to all other courses given by the department. Laboratory work consists in the microscopic study of representatives of all the more important plant groups. This phase of the work is almost entirely devoted to morphology and histology, especial attention being given to the structure of higher plants. The lectures aim to amplify and interpret the laboratory work, dealing also with the function (physiology), classification (taxonomy) and ecology of plants. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only 1 lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 1 lecture; 3 laboratory periods. Credit, 4.

Assistant Professor Osmun and Mr. McLaughlin.

Elective Courses.

3. Cryptogamic Botany. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course may attend the lectures in Course 5. Prerequisite, Botany 2. Primarily for juniors. One lecture hour and 3 2-hour laboratory periods. Credit, 4.

Assistant Professor Osmun.

4. Cryptogamic Botany. — This is a continuation of Course 3. Prerequisites, Botany 2 and 3. Primarily for juniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 2. Assistant Professor Osmun.

5. Plant Pathology. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. Prerequisite, Botany 2. Primarily for juniors; 1 1-hour lecture and 1 2-hour laboratory period. Credit, 2.

Professor Stone, Assistant Professor Osmun and Mr. McLaughlin.

7. Plant Pathology. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Prerequisite, Botany 2. Seniors; students who take this course and continue in botany must take Course 8; 1 lecture period and 3 3-hour laboratory periods. Credit 5. Professor Stone.

8. Plant Pathology. — As stated in Course 7. Prerequisite, Course 7.

9. Economic Fungi. — This course comprises the study of economic fungi from a technical point of view, and is intended for those students who wish for a more comprehensive knowledge of the phylogenetic relationship of fungi. Laboratory work and lectures. Problems of a practical or technical nature intimately associated with the control of diseases are taken up Special monographs and more important station literature treating of the life history of fungi, etc., are studied. Prerequisites, Botany 2, 3 and 4. Must be followed by Course 10; seniors; 1 1-hour lecture period and 2 or 3 3-hour laboratory periods. Credit, 4 or 5. Professor Stone.

10. Economic Fungi. — As stated in Course 9. Prerequisite, Course 9.

11. Plant Physiology. — This course is largely experimental and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Prerequisite, Botany 2. Must be followed by Course 12; seniors; 1 1-hour lecture period and 3 3-hour laboratory periods. Credit, 5.

Professor Stone and Mr. McLaughlin.

12. Plant Physiology. — As stated in Course 11. Prerequisite, Course 11.

13. Shade-Tree Management. — Physiology and pathology of shade trees. This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Prerequisite, Botany 2. Must be followed by Course 14; seniors; 1 1-hour lecture period and 2 3-hour laboratory periods. Credit, 4. Professor Stone.

14. Shade-Tree Management. — Physiology and pathology of shade trees. As stated in Course 13. Prerequisite, Course 13.

15. Histological Technique. — This course comprises training in general histological methods, including the use of precision microtomes, various methods of killing, fixing, sectioning, staining and mounting of plant materials. This is a technical course in histology, of value to students intending to become research or teaching botanists. It is recommended for students taking Courses 9 and 10, as an aid to the study of relationship between host and parasite, and is open to those taking Courses 13 and 14 who desire to make their studies in tree structure more comprehensive than provided for in these courses. Collateral reading and conferences. Prerequisites, Botany 2, 3 and 4. Seniors; 3 or 5 2-hour laboratory periods. Credits, 3 or 5.

Assistant Professor Osmun.

16. Histological Technique. — This is a continuation of Course 15. Prerequisite, Course 15. Seniors; 3 or 5 2-hour laboratory periods. Credits, 3 or 5.

Assistant Professor Osmun.

GENERAL AND AGRICULTURAL CHEMISTRY.

Professors Lindsey, Wellington and Chamberlain, Associate Professor Peters, Assistant Professor Anderson, Messrs. Bogue, Fowler, Serex, Robinson and Brown.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the other sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and who intend following chemistry as a vocation are prepared for positions as instructors in high schools and colleges, in the agricultural experiment stations, the United States Department of Agriculture, as well as in fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take graduate work leading especially to the degree of M.Sc., and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.]

Required Courses.

1. General Chemistry. — *The Non-metals.* — An introduction to the fundamental chemical laws, together with a study of the common acid forming elements and their compounds. Kahlenberg's "Outlines of Chemistry" is used as a text. The laboratory work is of two kinds. Those beginning the subject form one division and those who present chemistry for entrance are grouped in other divisions. The advanced divisions, in addition to work not usually done in high schools, study simple volumetric quantitative processes such as the determination of the hardness of water, the available oxygen in hydrogen peroxide, the chlorine in soluble chlorides, the oxygen in bleaching powder and the strengths of solutions of acids and bases. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor Peters, Assistant Professor Anderson, Mr. Bogue and Graduate Assistants.

2. General Chemistry. — *The Metals.* — A continuation of Course 1. A study of the metals and their compounds. The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate from gas liquor, sulfur and arsenic insecticides and superphosphates,

in addition to preparations outlined in Blanchard's "Synthetic Inorganic Chemistry." Attention is paid to the subjects of mass action and colloids. Prerequisite, Course 1. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Assistant Professor ANDERSON, Associate Professor PETERS, Mr. BOGUE and Graduate Assistants.

Elective Courses.

3. QUALITATIVE ANALYSIS. — *Basic.* — A course in the systematic analysis of metallic salts, presented from the ionic viewpoint. The student studies closely the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Böttger's "Qualitative Analysis" and Treadwell-Hall's "Qualitative Analysis" for reference. Prerequisite, Course 2; should be taken, particularly, by all intending to follow chemistry as a vocation. Sophomores; lecture, 1 hour; laboratory, 4 hours. Credit, 3.

Assistant Professor ANDERSON and Mr. SEREX.

4. QUALITATIVE ANALYSIS. — *Acidic.* — A continuation of Course 3. A large part of the semester is spent in the examination qualitatively of minerals and of agricultural products. Prerequisite, Course 3. Sophomores; lecture, 1 hour; laboratory, 4 hours. Credit, 3.

Assistant Professor ANDERSON and Mr. SEREX.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates, proteins, etc. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for future work in agricultural chemical investigation. Prerequisites, Courses 1, 2, 3 and 4 (courses 3 and 4 will not be required as prerequisites for those majoring in other courses than chemistry). Juniors; those electing Course 5 are expected to elect Course 6. Lectures, 3 hours; laboratory, 4 hours. Credit, 5.

Professor CHAMBERLAIN and Mr. FOWLER.

6. As stated under Course 5.

Professor CHAMBERLAIN and Mr. FOWLER.

7. AGRICULTURAL CHEMISTRY. — This course and Course 8 are designed as alternatives for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but are planning to enter practical agricultural work and desire a further knowledge of chemistry as it is related directly to practical

agriculture and agricultural problems. The work is planned in two parts, viz.: *Course 7, Inorganic Agricultural Chemistry*, the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the more important fungicides and insecticides, and the common materials of construction, such as tile, brick, cements, paints, oils, etc.; and *Course 8, Organic Agricultural Chemistry*, the study of the composition, physiological processes, uses and nutritive value of plants, and the composition and general processes of nutrition and growth of animals; also the study of products related to plants and animals, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspects of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8. Lectures, 2 hours; laboratory, 2 hours. Credit, 3. Professor Wellington and Mr. Fowler.

8. Organic Agricultural Chemistry. — As stated under Course 7. Professor Chamberlain and Mr. Fowler.

9. Quantitative Analysis. — Instruction in this course includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals in minerals and industrial products. Aside from teaching accurate observation and care in manipulation, it is intended for those who would learn the exact methods for determining the elements, particularly, in inorganic substances, and is the forerunner of other courses intended to fit men to become expert analysts. Talbot's "Quantitative Chemical Analysis" is used as a text. Prerequisites, Courses 1, 2, 3 and 4. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.
Professor Wellington and Assistant.

10. Agricultural Chemical Analysis. — In this course and Course 11 the methods previously studied, and other approved methods, are applied to the examination of agricultural materials. The analysis of fertilizers, insecticides, fungicides and soils is followed by that of cattle foods, dairy products, sugars, starches and allied substances. Prerequisite, Course 9. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.
Professor Wellington and Assistant.

11. Agricultural Chemical Analysis. — As stated under Course 10. Prerequisite, Course 10. Seniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5. Associate Professor Peters and Assistant.

13. Physiological Chemistry. — This course is intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work in botany, agronomy, animal husbandry, bacteriology, etc., and who have had Courses 5 and 6, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 5 and 6 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic ani-

mals is the principal subject. In the laboratory, experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion. The course gives additional training in the chemical problems of agricultural experiment station work, especially those connected with investigations in animal and plant nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Courses 7 and 8. Prerequisites, preferably, Courses 5 and 6 or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3. Professor Chamberlain and Mr. Fowler.

15. Physical Chemistry. — A résumé of general chemistry from the viewpoint of physical chemistry and the application of physical chemistry to agricultural chemistry. Prerequisite, Course 9. Juniors and seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Assistant Professor Anderson and Mr. Serex.

[General Statement concerning Courses 12, 14 and 16. — Each student electing either of these courses will be required to take up and follow out some special line of work, the object being to acquaint him with methods of original inquiry. A single concrete example may be found in a comparative study of the different methods for the determination of the several forms of nitrogen. A thesis may not be required, but frequent consultation of the literature bearing on the subject will be necessary. These courses are valuable for all chemists, and particularly so for those intending to take up experiment station work. A student may choose any one but not two of these separate courses.]

12. Special Work in Agricultural Chemical Analysis. — Topics for laboratory study will be assigned to each student. Prerequisite, Course 11. Seniors; laboratory, 10 hours. Credit, 5. Associate Professor Peters.

14. Special Work in Physiological and Organic Agricultural Chemistry. — In this course, as in Courses 12 and 16, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, etc. Prerequisites, Courses 5, 6 and 13. Seniors; laboratory, 10 hours. Credit, 5. Professor Chamberlain.

16. Special Work in Physical Chemistry. — The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student will select one line of work and follow it through the course, repeating some of the original work. Prerequisite, Course 15. Laboratory, 10 hours. Credit, 5.
Assistant Professor Anderson.

18. History of Chemistry. — An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief

mention in order that the questions of vital interest in modern life and industry may be studied at greater length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course. Seniors; lectures, 2 hours. Credit, 2.

Professor WELLINGTON.

ENTOMOLOGY.

Professor FERNALD, Associate Professor CRAMPTON, Assistant Professor GATES, Mr. MARTIN, ———.

Elective Courses.

1. GENERAL AND ECONOMIC ENTOMOLOGY. — Course 1 comprises a general introduction to the study of insects, including studies on their structure as applied to their identification; the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collections, and methods for their control. The most important insecticides and their preparation and application are also treated. Students electing Course 1 are expected to take Course 2. Juniors; 3 lecture periods. Credit, 3. Professor FERNALD.

2. GENERAL AND ECONOMIC ENTOMOLOGY. — A continuation of Course 1, with laboratory and field work on methods of collecting, preserving and studying insects and their work. Juniors; 2 laboratory or field periods. Credit, 3. Professor FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided, the time spent on the various subdivisions differing somewhat according to the particular needs of those taking it; and it is to a large degree given in the form of individual instruction, special attention being paid to the pests attacking the particular crops in which the student is most interested. The student may specialize in fruit pests, market-garden pests, greenhouse pests, field crop pests, etc., to a large extent, in accordance with his plans for future work.

A. Morphology. — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. Histology. — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

C. Insecticides and Apparatus. — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects; tests for detecting adulterations; comparative tests of nozzles and other apparatus; and a study of other methods of insect control, together with laboratory work.

D. Coccidology. — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

E. Bibliography. — Studies of the various entomological publications and of the methods of finding the literature on any insect.

F. Special Studies. — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing Course 3 are expected to take Course 4; 1 1-hour lecture period and 3 2-hour laboratory or field periods. Credit, 4.

Professor Fernald, Associate Professor Crampton, Mr. Martin.

4. Advanced Entomology. — As stated in Course 3. Prerequisite, Course 3.

5. Forest Insects. — A study of insects injurious to forest trees and of methods for their control, with laboratory and field work on these insects, and a study of what has been published about them. Seniors; prerequisites, Entomology 1 and 2; 1 lecture and 2 2-hour laboratory or field exercises. Credit, 3. Professor Fernald.

8. Beekeeping. — This course comprises a general consideration of the biology of the honey bee and the elements of practical beekeeping. Some topics covered are: life history, general behavior and instincts, structure, products, relations of bees to plants, the honey flora. The course aims particularly to afford first-hand, practical experience with bees, to the end of enabling their proper maintenance for any purpose, horticultural, educational or apicultural. Bee diseases, a thorough understanding of which is fundamental, are emphasized. So far as possible the work is made individual in constructing materials and apparatus and in the manipulation of bees. Juniors; seniors may elect. Courses 1 and 2 form a desirable preparation; 2 lectures, 1 2-hour laboratory period. Credit, 3.

Assistant Professor Gates and Mr. ——.

10. Advanced Beekeeping. — This course deals with the advanced and special problems of the beekeeper. Besides considering those difficulties which at present confront the industry, subjects necessarily of limited treatment in the previous course are expanded for the development of particular technique and manipulation. Apiary management, including the principles of queen rearing, are practiced. The course should further qualify for apicultural instruction and inspection service, affording familiarity with the special literature and methods needed in investigation and research. The policy of individual instruction is continued in so far as practicable. Primarily for seniors, but juniors may elect; prerequisite, Course 8; 1 lecture, 1 2-hour laboratory period. Credit, 2.

Assistant Professor Gates and Mr. ——.

11. Evolution. — In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and

chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the appearance of man; his future in the light of his past development; and the evolution of human institutions and ideas. Consideration is also given to the theories concerning the factors of evolution, the general problems of heredity and similar topics. The course closes with a brief discussion of the philosophical, moral and social aspects of the problems involved, and the influence of the idea of evolution upon modern thought. The lectures are supplemented by collateral reading; and a portion of the time is used for the purpose of demonstration, or discussion by the class. Seniors; juniors may elect. Two lecture periods. Credit, 2.

Associate Professor CRAMPTON.

MATHEMATICS AND CIVIL ENGINEERING.

Professor OSTRANDER, Mr. DUNCAN, Mr. MACHMER, Mr. HAZELTINE.

Required Courses.

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra." Freshmen; 3 hours a week. Credit, 3. Mr. DUNCAN, Mr. MACHMER and Mr. HAZELTINE.

2. HIGHER ALGEBRA. — As stated under Course 1. Mr. MACHMER.

3. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours a week. Credit, 2. Mr. DUNCAN, Mr. MACHMER and Mr. HAZELTINE.

4. PLANE TRIGONOMETRY (in Charge of Department of Physics). — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Freshmen; 3 hours. Credit, 3. Professor HASBROUCK and Assistant Professor ROBBINS.

Elective Courses.

5. MENSURATION AND COMPUTATION. — An elective, 3 hours per week, during the first semester, junior year. The course includes a review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule.

Also the graph, mensuration of plane and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of wood working; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements. Three hours. Credit, 3.

Mr. MACHMER.

6. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3. Mr. DUNCAN and Mr. HAZELTINE.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2, 3 and 4. Primarily for juniors; 3 hours a week. Credit, 3.

Professor OSTRANDER.

8. DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 3, 4 and 7. Primarily for juniors; 5 hours. Credit, 5. Professor OSTRANDER.

10. ROADS AND RAILROADS. — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures; 6 hours. Credit, 5. Professor OSTRANDER.

11. HYDRAULICS AND SANITARY ENGINEERING. — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures; 3 hours. Credit, 3.

Professor OSTRANDER.

12. ELEMENTARY STRUCTURES. — An elementary course in roofs and bridges. Text-book and lectures; 6 hours. [Not given in 1913–14.] Credit, 5. Professor OSTRANDER.

13. MATERIALS OF CONSTRUCTION, FOUNDATIONS AND MASONRY CONSTRUCTION. — Text-book and lectures; 4 hours. [Not given in 1913–14.] Credit, 3. Professor OSTRANDER.

15. APPLIED MECHANICS. — A course in applied mechanics, based on the calculus, with problems. Text-books and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Credit, 3. Professor OSTRANDER.

PHYSICS.

Professor Hasbrouck, Assistant Professor Robbins.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

Required Course.

1. General Physics. — General physics covers mechanics of solids, mechanics of fluids, wave motion and heat. These topics are chosen for the required work because they are regarded as the most fundamental of all, and there is no part of the work in physics more necessary for the student who plans to take up practical farming. Course given by text-book and lectures. Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5. Professor Hasbrouck and Assistant Professor Robbins.

Elective Courses.

2. General Physics. — Electricity and light. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3. Assistant Professor Robbins.

3. Electricity, Heat and Light. — Three-hour lecture and laboratory course open to juniors and seniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Assistant Professor Robbins.

4. Continuation of Course 3, open to juniors and seniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Assistant Professor Robbins.

[Mathematics 4 (trigonometry) is, for convenience of grouping, listed under Mathematics, although in charge of the Department of Physics.]

VETERINARY SCIENCE.

Professor Paige, Associate Professor Gage.

[The courses in veterinary science have been arranged to meet the needs of students who propose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

First Semester.

1. Veterinary Hygiene and Stable Sanitation. — This course is intended to familiarize the student with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals. Juniors and seniors; 3 hours. Credit, 3. Professor Paige.

3. Comparative (Veterinary) Anatomy. — The anatomy of the horse is studied in detail, and that of other farm animals compared with it where differences exist. This course is essential for those students wishing to elect Course 4. Juniors and seniors; 3 hours. Credit, 3. Professor Paige.

5. Essentials of General Pathology. — This course is planned to introduce the student to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis will be considered in the laboratory. The various chemical and biological reactions and tests will be presented from the standpoint of pure science, showing applications of chemistry and biology. The course will serve to liberally educate and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

7. Avian Pathology (Course in Poultry Diseases). — The object of this course is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. The work will consist of a systematic study of the diseases of the alimentary tract, liver and abdominal region, followed by a study of the diseases of the respiratory system, circulation and kidneys. The important disease-producing external and internal parasites will be considered; also diseases of the skin and reproductive organs. Lectures and demonstrations. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

Second Semester.

2. General Veterinary Pathology, Materia Medica and Therapeutics. — In this course such fundamental and general pathological conditions are studied as inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in the diagnosis, prevention and treatment of disease. The course in Pathology is followed by one in Materia Medica and Therapeutics, dealing with the origin, preparation, pharmacology, pharmacy, administration and therapeutic use of the more common drugs. Poisonous plants and symptoms and treatment of plant poisoning are also considered. Juniors and seniors; 3 hours. Credit, 3. Professor Paige.

4. Theory and Practice of Veterinary Medicine; General, Special and Operative Surgery. — A course intended to familiarize the student with the various medical and surgical diseases of the different species of farm animals. Particular attention is given to diagnosis and first-aid treatment. The student is taught the technic of simple surgical operations that can with safety be performed by the stock owner. This course should be preceded by Course 3, and taken in conjunction with Course 2. Lectures, demonstrations and practice. Juniors and seniors; 3 hours. Credit, 3.

Professor Paige.

6. Essentials of General Animal Pathology. — This is a continuation of Course 5, and is devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease will be considered. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

ZOÖLOGY AND GEOLOGY.

Associate Professor GORDON, Mr. BLANCHARD.

ZOÖLOGY.

Required Course.

1. ELEMENTARY ZOÖLOGY. — This course presents the underlying principles of biology and the zoölogical part of an introductory course. Laboratory dissection and lectures. Sophomores; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3.

Associate Professor GORDON and Mr. BLANCHARD.

Elective Courses.

3. INVERTEBRATE OR VERTEBRATE ZOÖLOGY. — These are separate courses running throughout the year. They are scheduled for the same hour. The student may elect one or the other, but not both in the same year. The course in invertebrate zoölogy is designed primarily for students who are planning to take up entomology, but is open to any one. The course in vertebrate zoölogy deals with comparative vertebrate anatomy and physiology and is designed for those who desire or require a knowledge of the comparative anatomy and physiology of vertebrated animals. Each course includes laboratory, text-book and lecture work. These courses are scheduled in the junior year, but are open to seniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Hours by arrangement.

Associate Professor GORDON and Mr. BLANCHARD.

4. INVERTEBRATE AND VERTEBRATE ZOÖLOGY. — The continuation and completion of Course 3 of the first semester; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3.

Associate Professor GORDON and Mr. BLANCHARD.

5. ADVANCED ZOÖLOGY.[1] — Elective work in advanced zoölogy is offered to seniors who are interested in zoölogy or who are looking forward to advanced work in any department of zoölogy or allied branches; 2 1-hour periods and 3 2-hour periods during the fall semester. Credit, 5. Hours by arrangement. Associate Professor GORDON and Mr. BLANCHARD.

6. ADVANCED ZOÖLOGY.[1] — This course may be a continuation of the work of the first semester or of separate character; 1 1-hour period and 2 2-hour periods during the spring semester. Credit, 3. Hours by arrangement.

Associate Professor GORDON and Mr. BLANCHARD.

GEOLOGY.

Elective Course.

2. ELEMENTARY GEOLOGY. — Rock-forming minerals; rock types; rock weathering; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 1-hour period and 2 2-hour periods. Credit, 3.

Associate Professor GORDON and Mr. BLANCHARD.

[1] The work offered in Courses 5 and 6 may apply on a minor for the degrees of master of science or doctor of philosophy.

DIVISION OF THE HUMANITIES.

Professor Sprague.

ECONOMICS AND SOCIOLOGY.

Professor Sprague.

[The courses in Economics and Sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.]

Required Course.

1. Political Economy. — An introductory course which takes up the study of the nature and scope of economics, the evolution and organization of the present economic system, and the fundamental principles of production, exchange and consumption. The class will study and discuss such topics as wealth, value, capital, interest, profits, wages and labor, tariffs, trusts, etc. Debates on current economic problems will be organized in the class. Text-book, library readings, lectures and discussions. Arranged primarily for juniors; open to seniors; 3 hours. Credit, 3. Professor Sprague.

Elective Courses.

2. Industrial Problems. — This is a course in the most important industrial problems of the day, covering the methods of organizations of labor and capital, systems of industrial remuneration, means of securing industrial peace, legal status of labor unions and their activities, protective legislation for workmen and employers, the problems of immigration, the sweated industries, prison labor, child labor and industrial education. Text-book, with collateral readings, lectures and discussions; 3 hours. Credit, 3.

Professor Sprague.

4. Anthropology; the History of Human Civilization. — The evolutionary origin and history of man; characteristics of primitive men, departure from the animal status, and the beginnings of civilization; development of industries, arts and sciences; the growth of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern conditions; characteristics of the leading races of the world. These topics will constitute the subject-matter of the course. Arranged for sophomores and juniors. Library readings, text-book and lectures; 3 hours. Credit, 3.

Professor Sprague.

5. Public Finance, Money and Banking. — This course follows Economics 1. It will take up taxation and the various systems for collecting public revenue in Europe and America, with the problems involved; the history of money and the systems of banking and finance now in operation; the causes and problems of economic crises and depressions; the currency problems of the United States. For juniors and seniors. Readings, lectures and discussions; 3 hours. Credit, 3. Professor Sprague.

7. Social Institutions and Social Problems. — This course is devoted to the study of the social institutions, such as the family, the church, State and property; and to such current social problems as divorce, race suicide, crime and prison reform, poverty and its relief. Considerable time is given to the study of eugenics in its social significance and possibilities. The correctional and charitable institutions of Massachusetts are studied in some detail. The later weeks of the term are devoted to a short introduction to sociological theory. Arranged especially for seniors; open to juniors by permission. Readings, lectures, discussions; 3 hours. Credit, 3.

Professor Sprague.

8. Modern Social Reform Movements. — The history of property and its vital issues in modern times; the socialistic systems, anarchy and communism; systems of workingmen's insurance in Europe and America, and other methods of relief from the chances of life; educational reforms, in process, to meet the demands of a new age, and legislative remedies for the evils of social change and maladjustment; the crisis of Christianity under modern capitalized industrialism. These topics indicate the nature of the subjects studied. This course is arranged to follow Economics 7; 3 hours. Credit, 3.

Professor Sprague.

HISTORY AND GOVERNMENT.

Associate Professor Eyerly, Mr. Holcomb.[1]

Elective Courses.

1. Elements of Political Science. — Nature and scope of political science; origin and evolution of the State; systems of government in the principal European States; organization and working of the national and of the State governments of the United States; relation of government to political parties and to public opinion; the functions of government as related to labor and commerce. Three hours. Credit, 3.

Associate Professor Eyerly.

2. Local Political Institutions. — A comparative study of the organization, functions and achievements of country and city groups, especially as these are concerned with such matters as taxation, finance, licenses, franchises, public ownership, highways, transportation and communication, water supply, fire protection, public lighting, markets, food inspection, garbage and sewage disposal, infectious diseases, housing conditions, police force, parks and playgrounds, libraries, schools, care of dependents. Three hours. Credit, 3.

Associate Professor Eyerly.

3. The History of New England. — In this course, New England is regarded as a unit. Although the history of agriculture and of rural life is treated with special fulness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3. Mr. Holcomb.

[1] Mr. Holcomb resigned Nov. 1, 1913.

5. The History of Ideals. — This course treats history from the idealistic rather than from the economic point of view. It attempts to define the great ideals which have impelled some of the most important social, political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. Lectures and reading; 3 hours. Credit, 3. Mr. Holcomb.

LANGUAGES AND LITERATURE.

Professor Mills.

LANGUAGES AND LITERATURE: ENGLISH, JOURNALISM AND PUBLIC SPEAKING.

Associate Professor Neal,[1] Professor Lewis, Assistant Professor Smith, Mr. Wattles, Mr. Prince, Miss Goessmann.

English.

Required Courses.

1, 2. Freshman English. — Composition; introduction to literature. Recitations, laboratory practice and lectures; theme writing; conferences. Text-book and laboratory manual, Neal's "Thought-building in Composition." Freshmen; 4 hours. Credit, 4.

Associate Professor Neal, Assistant Professor Smith, Mr. Wattles, Mr. Prince.

3, 4. Sophomore English. — A general reading course in English literature. Prerequisite, Courses 2 and 3 respectively; sophomores; 2 hours. Credit, 2. Professor Lewis and Miss Goessmann.

Elective Courses in English Language and Literature.

[The department does not plan to give in any one year all the elective courses here outlined, but as far as practicable to provide each instructor with at least one course in literature as a needed balance to his work in composition, at the same time providing opportunity for instructors to teach and students to study literature in its various periods and aspects.]

[7. Expository Writing. — The principles of exposition, with exercises in composition. Subjects will be largely found in current events and contemporary thought, and treated editorially. A foundation course in more advanced composition, primarily for juniors but open to seniors; advised for those who plan to take Course 8. Not given in 1913–14. Two hours, with a third hour at the option of the instructor. Credit, 2. Mr. Wattles.]

[8. Expository Writing. — The principles of exposition with especial reference to technical writing, including the writing of bulletins; some atten-

[1] Absent on leave during first semester.

tion also to the more popular exposition of scientific facts. Primarily for juniors but open to seniors. First offered in 1912–13. Two hours, with a third hour at the option of the instructor. Credit, 2. Mr. Wattles.]

[9,] 10. Cultural Reading. — Outside individual reading courses, with reports and notebooks; examinations may be given if deemed advisable. Course 9 not offered in 1913–14. Credit, 1 hour. The Department.

13, 14. English Writers and Thought. — Studies, laboratory problems, readings, and reports in some period of English or American literature. Three hours. Credit, 3. Assistant Professor Smith.

15. Prose Masters of the Nineteenth Century. — A sympathetic study of the writings of Ruskin, Carlyle, Newman, Arnold and Stevenson. Junior and senior course; 3 hours. Credit, 3. Professor Lewis.

[16. Poets of the Victorian Age; Browning, Tennyson and Arnold. — This course will deal especially with the ethical and religious ideals of these poets as expressed in their most serious poems. Not given in 1913–14. Junior and senior course; 3 hours. Credit, 3. Professor Lewis.]

[17,] 18. Advanced Literature. — The courses vary from year to year. They will usually provide opportunity either for intensive study of great writers or the study of the historical development or the structure and characteristics of literary types and practice in composition. Course 17 not given in 1913–14. Three hours. Credit, 3. Associate Professor Neal.

Journalism.

[The courses in journalism emphasize rural journalism. They aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant the application of journalistic principles in getting and suitably presenting material adapted to the non-urban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. Members of the classes supply, under the head "The Bay State Ruralist," a feature page for the "Springfield Sunday Union." Members of all classes may be required to turn in copy regularly for such disposition as the instructor may determine, and must have free time for covering stories. Students wishing to proceed beyond elementary study are urged to consult with the instructor before making their election in other subjects for the junior-senior years, in order that the most helpful program of work may be arranged.]

Elective Courses.

[1. Introduction to Journalism. — The foundation conceptions and aims of journalism; practice in the simple forms of journalistic writing. Prerequisite to all other work in journalism, and valuable also to students preparing for practical farming, agricultural or general science, rural education, etc., as a vocation. [See Course 2, for 1913–14.] Two hours, with a third hour at option of the instructor. Credit, 2. Associate Professor Neal.]

2. Reporting. — News-gathering and news-writing. This includes the gathering and presentation of industrial and agricultural information, campus news or other stories, as may be directed. Courses 1 and 2 are the foundation courses in journalism. Students admitted to 2 who have not had 1 will be required to do extra work. In 1913–14, Course 1 will be given in semester 2 as Course 2; Course 2 not being given separately that year. Two hours, with a third hour at the option of the instructor. Credit, 2.

Associate Professor Neal.

[3,] 4. Journalistic Practice. — The gathering and preparation of material for publication. Prerequisite, Course 1 or its equivalent. Two hours, with a third hour at the option of the instructor. Credit, 2.

Associate Professor Neal.

[5,] 6. Advanced Journalistic Practice. — Informal; given only on application; students will be assigned work as editorial assistants or writers, or otherwise employed in some form of journalistic activity. Study of particular forms of journalistic writing, of special subjects and their journalistic presentation, of particular kinds of periodical, or of current topics may be directed, and the presentation of a thesis may be required. Hours to be arranged. Two hours. Credit, 1. Associate Professor Neal.

Public Speaking.

Required Courses.

1, 2. Freshman Public Speaking. — Freshman public speaking is required in either the first or the second semester at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Some attention is given to breath control and development of speaking voice, considerable attention to pronunciation and enunciation, and a large amount of attention to the preparation and delivery of extempore speeches. Text-book, Shurter's "Extempore Speaking," supplemented by lectures and discussions. Freshmen; in semester 1 or 2 as directed; 1 hour. Credit, 1. Mr. Prince.

8. Occasional Oratory. — Exercises for voice and gesture; a study of the elements of vocal expression and action; speeches on assigned topics; prescribed reading; the preparation and delivery of a formal oration or two. It is especially recommended for those who desire to enter the Flint contest. Two hours. Credit, 2. Assistant Professor Smith.

9. Debating. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the inter-collegiate debates. Prerequisite, Course 3; 2 hours. Credit, 2.

Assistant Professor Smith.

LANGUAGES AND LITERATURE: GERMAN.

Assistant Professor Ashley, Mr. Julian.

Required Courses.

1. Elementary German. — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering in German, and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German. Arranged for Freshmen; open by permission to other students; 4 hours. Credit, 4. Mr. Julian.

2. Elementary German. — As stated under Course 1. Prerequisite, Course 1.

3. Intermediate German. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Assistant Professor Ashley.

3A. Intermediate German. — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. Julian.

4. Intermediate German. — As stated under Course 3. Prerequisite, Course 3.

4A. Intermediate German. — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3.

5. Advanced German. — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor Ashley.

Elective Courses.

6. Advanced German. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Assistant Professor Ashley.

7. Scientific German. — Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students. Open to juniors who have completed Course 4A or more advanced work. Three hours. Credit, 3.
Assistant Professor Ashley.

8. Modern German. — As stated under Course 7.

9. Conversation and Composition. — Translating connected English into German. Reproducing outside readings in German orally in class; 1 hour. Credit, 1.

10. Scientific German. — As stated under Course 9.

11. German Literature. — Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust," and one modern typical drama. Prerequisite, Course 6 or 10.

Assistant Professor Ashley.

12. German Literature. — As stated under Course 11.

LANGUAGES AND LITERATURE: FRENCH.

Assistant Professor Mackimmie, Mr. Harmount.

Required Courses.

1, 2. Elementary French. — The essentials of grammar are rapidly taught, and will be followed by as much reading as is possible. This course is required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen, 4 hours. Credit, 4. Mr. Harmount.

3. Intermediate French (third year). — Training for rapid reading; the reading of a number of short stories, novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor Mackimmie, Mr. Harmount.

4. Intermediate French. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Assistant Professor Mackimmie.

5. Advanced French (fourth year). — A reading course; Balzac's "Eugenie Grandet" and "Le Père Goriot" and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.

Assistant Professor Mackimmie, Mr. Harmount.

Elective Courses.

6. Advanced French (fourth year). — A general view of the history of French literature; Kastner and Atkins' "History of French Literature." Several plays of the great classical dramatists will be read. Individual conferences on outside reading selected by the student. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.

Assistant Professor Mackimmie.

7, 8. Scientific French. — This course is planned to meet the requirements of the individual student and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read. Three hours. Credit, 3. Mr. Harmount.

9, 10. Modern French Literature. — The outline is intended as a suggestion. The exact subject matter of the course will be determined when the men are enrolled. The object of this course is to give an introduction to recent movements in French literature. In the drama, readings from Augier, A. Dumas, fils, Delavigne; in the novel, from Flaubert, the de Goncourts, Zola; in criticism, from Taine, Renan, Sainte-Beuve; for the literary history of the period Lanson's "Histoire de la Litterature Française." Prerequisite, the required French. Juniors or seniors; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

LANGUAGES AND LITERATURE: SPANISH.

Assistant Professor Mackimmie.

Elective Courses.

1. Elementary Spanish. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors or juniors; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

2. Modern Spanish Authors. — Reading from modern Spanish novel and drama. Prerequisites, Course 1. Seniors or juniors; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

LANGUAGES AND LITERATURE: MUSIC.

Assistant Professor Ashley.

Elective Courses.

1. History and Interpretation of Music. — History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Assistant Professor Ashley.

2. History and Interpretation of Music. — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1.
Assistant Professor Ashley.

DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

AGRICULTURAL ECONOMICS.

Associate Professor Cance, Mr. Baird.

Required Course.

2. Agricultural Industry and Resources. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Associate Professor Cance and Mr. Baird.

Elective Courses.

3. Elements of Agricultural Economics. — This course is designed to follow the required work in the elements of economics. It deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; determination of price; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Associate Professor Cance.

5. Historical and Comparative Agriculture. — Recommended to students in journalism or education. A general survey of agriculture, ancient and modern: feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Seniors and juniors; open to other students upon arrangement; prerequisite, Course 3 or equivalent; 3 hours. Credit, 3.

Associate Professor Cance.

6. Co-operation in Agriculture. — The course treats of the history, principles and business relations of agricultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements; (2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers,

and practical working plans for co-operative associations, with particular reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises; 3 hours. Credit, 3.

Associate Professor CANCE.

7. THE AGRICULTURAL MARKET. — A study of the forces and conditions which determine the prices of farm products, and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, transportation by freight, express and trolley, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market, direct sales and the like are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work. Juniors and seniors; 3 hours. Credit, 3.

Associate Professor CANCE.

8. PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the economic problems affecting the farmer. Some of these are: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems, — cost of producing farm products, farm labor in New England, immigration, shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors and juniors; open upon approval to other students; 2 or 3 hours. Credit, 2 or 3.

Associate Professor CANCE.

9. SEMINAR. — Research in agricultural economics and history: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1.

Associate Professor CANCE.

10. SEMINAR. — As stated in Course 9.

AGRICULTURAL EDUCATION.

Professor HART, Associate Professor MORTON.

Elective Courses.

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion and collateral readings and reports; 3 hours. Credit, 3.

Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports and a thesis on some phase of industrial education; 3 hours. Credit, 3.

Professor HART.

3. Rural School Problems. — This course is designed primarily for teachers. It consists of a study of the principles and methods of instruction, class management and the organization of subject-matter in agriculture for secondary schools; practice work in school and home gardens, instruction in elementary agriculture in grammar grades, demonstration lessons in class, and practice teaching in secondary schools where possible. One lecture period; 2 2-hour laboratory periods. Credit, 3. Professor Hart.

4. Continuation of Course 3, with similar periods and credit.
Professor Hart, Assistant Professor Morton.

5. Seminar in Education. — For students who have had Courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: rural school surveys and secondary school agriculture. Seniors and graduate students; 2 hours. Credit, 2. Professor Hart.

6. Seminar in Education. — As stated under Course 5.

Note. — Students who complete Courses 1, 2, 3 and 4 in this department and an approved major and minor in the following subjects may become candidates for a teachers' certificate: agriculture, biology, botany, chemistry, English, French, German, history, mathematics, physical geography, physics, physiology. See major in agricultural education for rules relating to teachers' certificates.

RURAL SOCIOLOGY.

Associate Professor Eyerly, President Butterfield, Professor Hart, Mr. Holcomb,[1] Mr. Strand.

Elective Courses.

1. The Rural Community. — A broad survey of the field of rural sociology, including such topics as the movements of the rural population, the social conditions and life of rural people, the influence of rural life, the description of the various social institutions of the rural community, an analysis of the fundamental problems of rural life, and the means of developing and redirecting the life of the rural community. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President Butterfield and Associate Professor Eyerly.

3. The Literature of Rural Life. — A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities; 3 hours. Credit, 3. Mr. Holcomb.[1]

4. Rural Law. — The work of this course will cover such points as land titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures, and class discussions; 1 hour. Credit, 1.
Professor Hart.

[1] Mr. Holcomb resigned Nov. 1, 1913.

8. The Social Conditions of the Rural People. — Composition of the rural population; nature, extent and causes of diseases and accidents; health agencies of control; extent and causes of delinquency and dependency; conditions of temperance, of sexual morality and family integrity; child labor; woman's work and position; relation of employer to employee; standard of living; size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics; 3 hours. Credit, 3.

Associate Professor Eyerly.

6. Sociological Aspects of Co-operation among Farmers. — An historical sketch of the origin, extent and success of co-operation among farmers in the various European countries and in the United States; personal qualities and social conditions necessary to successful co-operative endeavor; the various forms of co-operative organization viewed in their industrial, intellectual and moral aspects; the influence of co-operation on the farmer's individualism, conservatism, self-help, thrift, contentment and on agrarian legislation, scientific agriculture and farm labor; the relation of co-operation to neighborhood life, to community pride and loyalty, to further associated effort, to class stability, solidarity and status; the demand of co-operation for a new type of leadership; the relation of co-operation to socialism and the competitive system; 3 hours. Credit, 3. [Not given in 1913–14.]

Associate Professor Eyerly.

2. Rural Institutions. — A study of the organized agencies by which rural communities carry on their various forms of associated life; particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment. Special attention given to the rural family and the rural church; 3 hours. Credit, 3.

Associate Professor Eyerly.

5. The State and the Farmer. — A general survey of political organizations and movements among farmers in foreign countries and their influence in shaping agrarian legislation; the character, extent and results of foreign State aid to the farming class; political movements among farmers in the United States; "Granger" legislation; relation of the Department of Agriculture, State boards of agriculture, agricultural colleges and experiment stations, postal system, railway commissions, highway commissions, public health agencies, etc., to rural welfare; 3 hours. Credit, 3.

Associate Professor Eyerly.

9. The Social Psychology of Rural Life. — Characteristics of the rural mind; character of hereditary and environmental influences; nature and effects of face-to-face groups; psychological effects of isolation, relative security and freedom from strain; relation of contact with nature, of control over immediate environment, of family co-operation and of neighborhood life to self-control, self-expression, sympathy, service and leadership; nature and effects of fashion, conventionality and custom; character of discussion and public opinion, and their relation to class feeling and organization; relation of individualism, conservatism and homogeneity to crowd phenomena and progressive democracy; 3 hours. Credit, 3.

Associate Professor Eyerly.

10. Farmers' Organizations. — The history, purposes and achievements of the Grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; the nature, scope, methods and history of local, State and national associations formed about some farm product or special farm interest, *e.g.*, dairying, horticulture, stock breeding, forestry; their influence on "better farming, better business, better living;" their influence in forming a class consciousness and in shaping legislation; need of federation; 3 hours. Credit, 3. Associate Professor Eyerly.

11. Sociological Aspects of Current Agricultural Questions. — Government conservation policy, roads, railways, trolleys, telephones, postal service, credit facilities, taxation, pure food laws, tenancy and ownership, intensive versus extensive farming, agricultural labor; 3 hours. Credit, 3. Associate Professor Eyerly.

13. Seminar. Associate Professor Eyerly.

GENERAL DEPARTMENTS.

MILITARY SCIENCE AND TACTICS.

Captain Martin.

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

The required uniform is of khaki, costing about $18. It is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $18 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

Required Courses.

1. Freshman Drill. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

2. Freshman Drill. — As stated under Course 1. Freshmen; second semester after spring recess; 3 hours. Credit, 1.

3. Sophomore Drill. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

4. Sophomore Drill. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1.

5. Sophomore Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1.
Captain Martin.

6. Sophomore Tactics. — As stated under Course 5. Sophomores; 1 hour. Credit, 1.

7. Junior Drill. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin.

8. Junior Drill. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1.

9. Junior Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports; returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1. Captain Martin.

10. Junior Tactics. — As stated under Course 9. Juniors; 1 hour. Credit, 1.

Elective Courses.

11. Senior Drill. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must take the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin.

12. Senior Drill. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1.

PHYSICAL EDUCATION AND HYGIENE.

Assistant Professor Hicks, Mr. Gore, Mr. Fitzmaurice.

Hygiene.

Required Course.

1. Hygiene. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1.
Assistant Professor Hicks.

Physical Education.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering.]

Required Courses.

1. Elementary Gymnastics. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit (given only for Course 2), 1. Mr. Gore and Mr. Fitzmaurice.

2. Elementary Gymnastics. — As stated under Course 1.

3. Graded Gymnastics. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit (given only for Course 4), 1. Mr. Gore and Mr. Fitzmaurice.

4. Graded Gymnastics. — As stated under Course 3.

5. Gymnastics. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit (given only for Course 6), 1. Mr. Gore and Mr. Fitzmaurice.

6. Gymnastics. — As stated under Course 5.

Elective Courses.

7. Training Course. — History of Physical Education; supervision of indoor and outdoor athletic contests and games; athletic administration. Seniors; 3 hours. Credit, 1. Assistant Professor Hicks.

8. Training Course. — As stated under Course 7.

THE GRADUATE SCHOOL.

The Graduate School.

Kenyon L. Butterfield, A.M., LL.D., President of the College.

Charles E. Marshall, Ph.D., Director of the Graduate School and Professor of Microbiology.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

Admission.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Nature and Methods of Graduate Work.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods

which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

Theses.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

Two copies of each thesis in its final form, ready for the printer, must be submitted to the director of the school before the candidate for the degree may take the required oral examination. One of the said copies, to contain all drawings, is to be retained as an official copy by the said director, and the other by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis. When printed, three copies of each thesis must be deposited with the director of the graduate school and three copies with the department in which the work was carried out.

All theses become the property of the department in which they are prepared.

Final Examinations.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors

taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

Degrees Conferred.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.
2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.
3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.
4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.
5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.
2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.
3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.
4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.
5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

Courses for Degree of Master of Science.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.
Zoölogy (minor only).

Courses for the Degree of Doctor of Philosophy.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zoölogy.

General Outline of Courses for the Doctorate.

Major Courses.

Botany. — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Ecology.
(*d*) History of Botany.

In the graduate course in botany special attention is given to such subjects as plant physiology and pathology, ecology and the history of botany, etc. These subjects are pursued to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and weekly lectures are given, together with occasional seminars, in which various new problems of botanical science are considered. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

Chemistry. — The department is prepared to offer advanced courses in the following branches of chemistry, particularly as applied to agriculture: —

(*a*) Inorganic chemistry.
(*b*) Organic chemistry.
(*c*) Physiological chemistry.
(*d*) Physical chemistry.
(*e*) Analytical chemistry.

Here follows a statement of courses which may be selected by any one properly qualified, and particularly by those who are desirous of doing work for advanced degrees: —

Course A. Research in industrial problems applied to agriculture.
Associate Professor Peters.

Course B. Research in physico-agricultural chemistry. Prerequisite, Course 15 or its equivalent. Assistant Professor Anderson.

Course C. Advanced analytical chemistry. Research work in connection with the study of methods of analysis of fertilizers, cattle feeds, dairy products, soils, insecticides and sugars. Recent and original methods will be applied to a study of the composition of agricultural products.
Professor Wellington or Associate Professor Peters.

Course D. Advanced organic chemistry. Special topics in advanced organic chemistry will be considered, both by lectures and in the laboratory. These will include such subjects as constitution and properties of carbohydrates, proteins and fats, uric acid and related compounds, and alkaloids;

also such purely chemical phenomena as isomerism, tautomerism and optical rotation. The reading will include "The Monographs on Biochemistry," Cohen, Schorlemmer and Lachman. Professor CHAMBERLAIN.

Course E. Advanced topics in physiological agricultural chemistry will be studied especially in the laboratory, including digestion, metabolism and nutrition, dietetics, feeding rations, enzymatic action and isolation of enzymes. Required reading will be followed in Abderhalden, Lusk, Hammersten, Stiles, Armsby and Euhler. Professor CHAMBERLAIN.

Students for the advanced degrees of master of science and doctor of philosophy will be given a special outline of work, and will also be assigned a subject for an original thesis by the professor in charge of the work, all of which must be completed to the satisfaction of the chemical staff and particularly of the professor under whom the work is done. Students not working for a degree may take special work along agricultural chemical lines. Information may be obtained by consulting the chemical staff.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogeny; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best article on the various topics named above and on the different orders of insects, to cover from fifteen thousand to

twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

Horticulture. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now constitute the college Division of Horticulture, and which are as follows: Pomology, Floriculture, Landscape Gardening, Forestry and Market Gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in General Horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Prof. F. A. Waugh, head of the Division of Horticulture.

Zoölogy. — Courses in zoölogy are available as a minor for the degree of master of science, and as a minor for the degree of doctor of philosophy. The nature of the work varies according to circumstances, and may be intensive in a special field, or of a somewhat more general character, depending on the student's previous acquaintance with general zoölogical science.

The time devoted to zoölogy as a minor for either of the above-named degrees may vary from 12 to 16 hours per week, pursued for a year and a half.

Notes.

1. The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised by the graduate staff and credit granted as are essential to the highest standards of efficiency.

2. All time statements refer to the minimum time recognized. It will be readily understood that diligence, seriousness of purpose, capacity, proficiency, and effectiveness cannot be measured by a definite number of hours.

3. A course may be outlined for a student by any department, subject to the approval of the graduate staff. The courses offered above, however, constitute the established courses at present.

THE SHORT COURSES

AND

THE EXTENSION SERVICE.

The Short Courses and the Extension Service.

THE EXTENSION SERVICE.

Through its Extension Service, the Massachusetts Agricultural College attempts to make every department of the institution a contributing factor toward developing the agriculture and country life of the Commonwealth. The work of the Extension Service divides itself quite naturally into the Short Courses given at the college and the various activities of an educational nature which are carried on all over the State.

Under the usual definition of extension activities, Short Courses are not strictly extension projects. They are rather a part of the academic work of the institution. For the sake of administrative efficiency it has seemed best to place them in charge of the director of the Extension Service in so far as organization and direction are necessary. An effort is made through these courses to bring to the college, for a few days or a few weeks, as many people as can possibly be reached in this way. In the main, the instruction in the Short Courses is given by the regular teaching force of the college, the same laboratories and equipment being used for this work as in the regular college work.

The Extension Service proper comprises various methods for the dissemination of agricultural information to the people of the Commonwealth who are interested in agriculture and country life, but who cannot come to the college for even a short time. The object of the Extension Service is to make the college as useful to the people of the Commonwealth as possible.

SHORT COURSES GIVEN AT THE COLLEGE.

A. Winter School.
 1. Ten Weeks' Courses.
 2. Apple Packing School.
 3. Farmers' Week.
 4. Beekeepers' Course and Convention.

B. Summer School.
 1. Summer School of Agriculture and Country Life.
 2. School of Rural Social Service.
 3. Conference on Rural Community Planning.
 4. Boys' Agricultural Camp.
 5. Poultry Convention.

C. Miscellaneous Short Courses.
 1. The School for Tree Wardens.
 2. Short Courses for Other Groups.
 3. Special Days for Foreigners.
 4. Meetings of Organizations at the College.

Expenses of the Short Courses. — The expense of attending any of the Short Courses is approximately as follows: —

Registration fee (Ten Weeks' Course, Apple Packing School, Summer School),	$5
Furnished rooms in private houses (per week),	$1.50–$3
Board at college dining hall, per week,	$4
Board with private families, per week,	$5–$6

A lunch counter is operated in connection with the college dining hall. Meals may be obtained there *à la carte* at very reasonable prices.

Students in each of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work. The cost in Amherst is about $1.25 for suit and cap.

Requirements for Admission to Short Courses. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic. Practical experience in farm, garden, orchard or greenhouse work is an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age and must furnish satisfactory evidence of good moral character. References are required and these are investigated before applicants are accepted.

A. Winter School, 1914.

1. Outline of the Ten Weeks' Courses (January 6 to March 13, inclusive). — The following courses are to be given: —

1. Soil Fertility. Associate Professor Haskell. Three lectures a week for ten weeks.
2. Field Crops. Mr. E. M. McDonald, Instructor in Agronomy. Three lectures a week for ten weeks.
3. Types and Breeds of Live Stock. Associate Professor McLean. Three lectures and two two-hour judging periods a week for ten weeks.
4. Live Stock Feeding. (Instructor to be announced.) Three lectures a week for ten weeks.
5. Live Stock Management. Mr. E. L. Quaife, Instructor in Animal Husbandry. One two-hour laboratory period each week.
6. Animal Breeding. Associate Professor McLean. One lecture and one two-hour laboratory period each week.
7. Dairying. Professor Lockwood, Mr. Coons and assistants. Five one-hour and two two-hour periods and two three-hour periods each week.
8. Dairy Bacteriology. Professor Marshall. Two lectures each week.
9. Animal Diseases and Stable Sanitation. Professor Paige. Two lectures each week.
10. Poultry. Professor Graham. Five lectures each week.
11. Fruit Growing. Professor Sears. Five lectures each week.
12. Market Gardening. Mr. B. C. Georgia, Instructor in Market Gardening. Three lectures each week.
13. Landscape Gardening. Assistant Professor Harrison. Two two-hour exercises each week.
14. Floriculture. Mr. E. J. Canning, Temporary Instructor. Five lectures and one field trip each week.
15. Forestry. Professor Clark. One lecture each week.
16. Botany. Mr. F. A. McLaughlin, Assistant in Botany. Two lectures each week.
17. Entomology. Professor Fernald. Three lectures each week.
18. New England Rural Life. Two lectures each week.
19. Farm Accounts. Professor Foord. One two-hour exercise each week.
20. Mechanics. Professor Lockwood and Mr. Schroyer. One two-hour exercise each week.
21. Rural Sanitary Science. Professor Marshall. Two lectures each week.
22. Beekeeping. Assistant Professor Gates and Mr. Byard. Three lectures and one laboratory period each week.
23. Rural Improvement. Professor Waugh. Two lectures each week.
24. Marketing Farm Products. Associate Professor Cance. One lecture each week.

2. Apple Packing School. — The work of this school, which is conducted by the department of pomology, is of a practical nature and includes both box and barrel packing. Persons taking the course will become familiar with the various types of packs and will receive sufficient practice to enable them to do good commercial packing.

The work in packing is supplemented by lectures on phases of commercial orcharding, such as planting, varieties, spraying, pruning, harvesting and marketing.

A fee of $5 to help pay for fruit and other materials used is charged for this course.

3. Farmers' Week. — In order to reach those who cannot come to the college for a longer time, this very practical course, four days in length, is given each year. The regular college equipment is used, and work of the regular faculty is supplemented by lectures and demonstrations by eminent men.

The work is divided into four sections: (1) General agriculture and farm management; (2) dairying, animal husbandry and poultry; (3) horticulture, including fruit growing, market gardening, floriculture and forestry; (4) women's section, including home economics, household management and so forth.

These sections take up the time from early morning until late afternoon. Prominent men are engaged for the evening lectures. Fruit, corn, dairy and poultry shows and other exhibits are among the leading features. No fee is charged. The date of the 1914 Farmers' Week is March 16 to March 20, inclusive.

4. Beekeepers' Course. — In the last few years a complete apiary and equipment has been brought together at the college, under the direction and management of Dr. Burton N. Gates. This equipment furnishes the best of facilities for the teaching of beekeeping and allied subjects. A conference of beekeepers, with extensive exhibits of beekeepers' supplies and apparatus, is held annually at the close of each short course.

The courses offered are: —

1. Practical Phases of Beekeeping. Assistant Professor Gates.
2. Crops for Honey Bees. Dr. Brooks.
3. Relation of Bees to the Pollination of Plants. Professor Stone.
4. Origin and Evolution of the Honey Bee. Professor Fernald.
5. Bees and Beekeepers' Supplies. Professor Paige.

The features of the convention are lectures, demonstrations by authorities of national reputation, as well as exhibits of inventors, manufacturers, supply merchants and queen rearers. A special invitation is extended to all beekeepers to display and demonstrate inventions, implements or methods. If table space is desired or special equipment is to be prepared, notice should be sent to Dr. Burton N. Gates, Amherst, Mass., at least two or three weeks before the convention. The college provides covered tables for the exhibits.

B. Summer Schools.

1. The Summer School of Agriculture and Country Life. — The Summer School of the Massachusetts Agricultural College will open June 30, 1914, for a term of five weeks. This will be the sixth session of this summer school, those of previous years having been highly successful. The experience of these five years will aid in making material improvements in the session of 1914.

The work of the summer school was designed originally for school-teachers, and the attendance has been largely of that class. Special attention will be

given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Extended courses will be offered for the benefit of such persons also.

The formal instruction in the summer school is given in definite courses herein described. From these each pupil may elect courses of not less than 10 nor more than 15 exercises a week, unless a larger or smaller amount of work is allowed by the director. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises will be arranged for one afternoon of each week. These will be on topics of interest to all. Excursions will be arranged for every Wednesday afternoon, and more extended excursions for the whole school will be planned for every Saturday. The excursions will be in charge of an instructor as heretofore. In the past they have proved a very enjoyable feature of the work.

Round table and special discussions will be arranged by various instructors as their courses require. A conference of rural social workers and educators of New England will be held July 2 to July 31. An outline of the conference will be found in another part of this bulletin.

A course of evening lectures on popular topics relating to the work of the school will be a feature of the general program. Several able lecturers have already been engaged for this course. Like everything else connected with the summer school, this lecture course is entirely free to all students.

Those who expect to attend should register as early as possible. *Registration fee for the summer school is $5, payable at the time application is made. Registration fee for clergymen attending the courses and conferences given especially for them is $1.* No other tuition is charged. These fees should accompany application blanks and should be made payable to the director of the summer school or the college treasurer.

A bulletin describing the Summer School is issued in March each year.

Faculty and Courses. — The faculty and courses given in the 1913 School were as follows:—

Kenyon L. Butterfield, LL.D. President of the College. Head of the Division of Rural Social Science.
William D. Hurd, M.Agr. Director of the Extension Service.
Marion S. Borden, B.S. Assistant in Home Economics.
Robert H. Bogue, B.Sc. Assistant in Chemistry.
Joseph Chamberlain, Ph.D. Associate Professor of Organic and Agricultural Chemistry.
William D. Clark, M.F. Professor of Forestry.
Laura Comstock. Extension Professor of Home Economics.
Samuel Coons. Instructor in Buttermaking.
Guy C. Crampton, Ph.D. Associate Professor of Entomology.
Burton N. Gates, Ph.D. Assistant Professor of Beekeeping.
B. C. Georgia, B.Sc. Instructor in Market Gardening.
Harold M. Gore, B. Sc. Assistant in Boys' Camp.
John C. Graham, B.Sc. Agr. Associate Professor of Poultry Husbandry.
Charles R. Green, B.Agr. Librarian.
F. Josephine Hall, A.M. Adviser for Women, Waltham, Mass.
William R. Hart, A.M. Professor of Agricultural Education.
Sidney B. Haskell, B.Sc. Associate Professor of Agronomy.
Curry S. Hicks, B.Sc. Assistant Professor of Physical Education and Hygiene.
George S. Holcomb, A.B., S.T.B. Lecturer in History.
William P. B. Lockwood, B.Sc. Agr. Associate Professor of Dairying.

Frederick A. McLaughlin, B.Sc. Assistant in Botany.
John A. McLean, B.Sc. Agr. Associate Professor of Animal Husbandry.
C. J. Maynard. Author and Lecturer on Bird Life, West Newton, Mass.
Orion A. Morton. Extension Professor of Agricultural Education.
E. L. Morgan, A.M. Community Field Agent.
A. Vincent Osmun, M.Sc. Assistant Professor of Botany.
Charles A. Peters, Ph.D. Associate Professor of Inorganic and Soil Chemistry.
Laura Post. Assistant in Physical Education, Wellesley College, Wellesley, Mass.
Edward Tallmadge Root. Secretary of the Federation of Churches of Massachusetts and Rhode Island, Boston.
Frederick W. Ried. Director of Practical Arts, State Normal and Training Schools, Framingham, Mass.
John A. Scheuerle. Formerly Pastor of County Church, Hartford, Vt.
Fred C. Sears, M.Sc. Professor of Pomology.
Robert J. Sprague, Ph.D. Head of Division of the Humanities and Professor of Economics and Sociology.
George E. Stone, Ph.D. Professor of Botany.
Frank A. Waugh, M.Sc. Head of Division of Horticulture and Professor of Landscape Gardening.
Edward A. White, B.S. Professor of Floriculture.

2. The School of Rural Social Service. — For the sixth season the Massachusetts Agricultural College offers a School of Rural Social Service, in connection with the usual Summer School of Agriculture and Country Life.

The social service spirit is abroad all over this country, and men are turning their attention to these subjects as never before. The courses offered this summer will give instruction, furnish information and direct the attention of those interested more particularly, to the rural field, which has as yet received little systematic study when compared with that which has been given city conditions.

This year more of a feature will be made of the group of courses given especially for those who might be classed as Rural Social Workers. These courses are intended for clergymen, teachers, librarians, town officers, grange workers and others who devote a considerable portion of their time to problems of community development. Courses 30 to 36, inclusive, as given in the summer school, are designed for the needs of these persons. All other courses given during this period are also open to those who register.

From all of these courses a group of studies can be arranged which will present the rural problem from several standpoints, and will serve to show the relationships of the workers in the different lines to their respective fields and to the larger community problems which are constantly being presented to them.

3. The Conference on Rural Community Planning. — This conference is held as a closing feature of the summer school each year. In it the larger problems of New England community development are freely discussed. The following organizations co-operate with the college in providing the programs: the Massachusetts Federation of Churches, the State Board of Education, the Free Public Library Commission, the Massachusetts Civic League, the State Board of Health, the County Work of the Y. M. C. A., the New England Home Economics Association and the Bureau of Statistics.

Section meetings of these groups are held each forenoon, a general round-table discussion is held each afternoon, and lectures are delivered each evening by persons prominent in social and educational work. Many small group conferences are also arranged.

Extensive exhibits showing in a graphic way what organizations and com-

munities are doing along welfare lines are arranged at the time of the conference.

The conference usually lasts four days, coming the last of July and first of August. A full program is published about June 1. There are no registration or other fees.

4. Boys' Agricultural Camp. — This camp is arranged in order that boys from rural districts and small towns may receive some instruction in agriculture and clean, wholesome sports, and that they may have impressed upon them their responsibilities as coming members of society. The daily program consists of camp duty, flag raising, agricultural lessons, talks on hygiene, good citizenship, and so forth, play and recreation, instruction in handicrafts, photography, evening camp fires and lectures by men prominent in boys' work. A small fee is charged to help defray the cost of maintaining the camp.

5. Poultry Convention. — In order to give a large number of poultrymen, who cannot come to the college for a longer time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, marketing poultry products, and so forth, — a convention lasting nearly a week is held each summer. The date of the 1914 meeting is from July 22 to July 24, inclusive.

C. Miscellaneous Short Courses.

1. The School for Tree Wardens. — This course is given in co-operation with the State Forester and the Massachusetts Forestry Association, to give tree wardens and city foresters instruction in the planting, care and preservation of trees, forestry practices, spraying, pruning, civic improvement, duties of tree wardens, and so forth. The 1914 school will be held from March 24 to 27, inclusive. No registration fees are charged. The cost of room and board is low.

2. Short Courses for Other Groups. — Plans are now under way to provide short courses at Amherst, lasting four or five days, for fertilizer agents, feed agents and dealers, milk inspectors, seed dealers and any other groups that may desire such instruction. Information concerning these may be obtained by writing the Extension Service.

3. Special Days for Foreigners. — Each year there are provided at the college special days for foreigners, especially the Polish farmers who have come into the Connecticut valley in large numbers. Instruction is given in the crops and animals in which these people are most interested, soil management, co-operation, the need of their becoming good American citizens, Polish history, and so forth. Similar work will gladly be arranged at the college, or in different sections of the State, for other nationalities.

4. Meetings of Organizations at the College. — It is customary for the various State organizations of fruit growers, poultrymen, breeders' associations, and so forth, to meet for conventions and picnics at the college. Such meetings are welcomed by the college authorities, and organizations are cordially invited to meet at the college. The Extension Service will provide facilities for seeing the college grounds, and help arrange programs and other forms of entertainment.

ITINERANT INSTRUCTION ARRANGED AT THE COLLEGE BUT GIVEN THROUGHOUT THE STATE.

1. CORRESPONDENCE COURSES. — The correspondence courses are offered by the college in response to calls from all sections of the State from people who desire agricultural information, but who cannot come to the college for it. The courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners, floriculturists and teachers in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added from year to year.

Method of Conducting Correspondence Work. — While a large number of books have been written on various agricultural subjects, very few of them are especially adapted to the correspondence course work. For this reason the courses are conducted principally by specially prepared lessons. The subject-matter partakes somewhat of the lectures that are given in the college classes. It is recommended that the student purchase whenever possible one or two books to read along with the course. Other books are recommended for collateral reading and these can be obtained oftentimes from the local libraries.

The courses are especially recommended to the Y. M. C. A. and to granges and other farmers' clubs for study. It is to be hoped grange lecturers, club secretaries and other interested persons will organize study classes. If the size of the class or the interest which the members take in the subject is sufficient, a representative of the college is sent to the class from time to time to discuss the work and offer suggestions. Below are the courses being given in 1914: —

1. Soils and Soil Fertility. Associate Professor HASKELL.
2. Manures, Fertilizers and Soil Amendments. Associate Professor HASKELL.
3. Field Crops. Associate Professor HASKELL.
4. Farm Dairying. Professor LOCKWOOD.
5. Fruit Growing. Professor SEARS and Mr. REES.
6. Market Gardening. Conducted by Mr. B. C. GEORGIA.
7. Animal Feeding. Mr. STORY.
8. Floriculture. Conducted by Mr. CANNING.
9. Farm Accounts. Professor FOORD.
10. Entomology. Professor FERNALD.
11. Pedagogy of Agriculture. Professor HART.
12. Beekeeping. Assistant Professor GATES.
13. Forestry. Professor CLARK.
14. Shade Tree Management. Professor STONE.
15. Gardening and Elementary Agriculture. Professor MORTON.
17. Poultry Husbandry. Professor GRAHAM.

Enrollment for Correspondence Courses. — Students may enroll in the courses any time between October 1 and June 1 of the following year. It has been found advisable not to continue the courses through the summer because the farmers as well as the other students are so busy that they cannot spend the necessary amount of time upon the lessons during the summer months.

Expenses of the Correspondence Courses. — In order that none may enroll but those who are interested and desire to pursue earnest study, a small fee is

charged. This has been fixed at the rate of $1 for each course except Courses 8 and 17, where it is necessary to charge $1 for each of the parts. The fee is payable strictly in advance, at the time the enrollment card is sent, and the first lesson of the course is not sent until the fee is paid.

2. Lectures and Demonstrations. — The members of the faculty of the college are glad to give lectures and demonstrations before granges, men's clubs, women's clubs, Y. M. C. A.'s, farmers' clubs, boards of trade and other organizations. A list of more than 40 lecturers and 200 subjects on various phases of agriculture, country life, economics, sociology, education, civic betterment and various scientific subjects has been prepared. Full courses of lectures or single lectures may be arranged.

Organizations arranging the lectures are asked to pay traveling expenses of the lecturer, provided no admission to the lecture is charged. If admission is charged, then the lecturer is entitled to a fee in addition to traveling expenses.

3. Extension Schools. — Probably the most valuable work done away from the college is in the "Extension Schools." The college sends a corps of instructors to a town for a five-day school of instruction. At present, the following courses are offered: soil fertility, animal husbandry and dairying, fruit growing, poultry and home economics.

It is also possible to arrange special Extension Schools along one line of work, such as fruit growing or any other subject in which the college has facilities for giving the work.

Communities desiring an Extension School make a written request for the same, agreeing to defray all local expenses, such as the rent, heating and lighting of a suitable hall, and the board of the instructors during the school.

4. Educational Exhibits at Fairs and Other Shows. — The college co-operates with the managers of fairs, industrial expositions, corn shows, poultry shows, fruit shows and other exhibitions by making educational exhibits.

For outside work a large tent has been provided. In this about thirty cabinets containing educational material are arranged in an attractive way. Accompanying the exhibit is a corps of lecturers and demonstrators who give practical instruction daily.

For inside work a space at least 40 by 60 feet is required for this exhibit.

Smaller exhibits along special lines are sent to corn, fruit and poultry shows, child welfare exhibits, milk shows and so forth.

The managers of fairs and exhibits are asked to help defray the expenses of putting on these exhibits.

5. Educational Trains. — The college, through the Extension Service, is glad to co-operate with railroad and trolley lines in the operation of educational trains and cars. The railroad usually furnishes the means of transportation, and looks after the operation of the train or cars. The college furnishes the exhibit and provides the lectures and demonstrations.

Extension Work conducted in Different Parts of the State.

1. Extension Work in Fruit Growing. — This work includes lectures and demonstrations on laying out and planting orchards, pruning, spraying, thinning, grading, packing and marketing fruits. Demonstration orchards, new and renovation plots, are being established all over the State, co-operatively between the college and the owners of land. Extension Schools of fruit growing and fruit grading and packing are arranged on request. Visits to

farms for advisory work are made so far as possible, and correspondence on orcharding subjects is invited.

2. Extension Work in Dairying and Animal Husbandry. — This work includes lectures and demonstrations on subjects pertaining to milk production, handling and marketing butter, and cheese making, instruction in barn planning, helps on swine and sheep raising. Assistance in organizing dairy improvement associations and breeders' associations is given; stock-judging contests for boys are arranged at the leading fairs; city milk inspectors may receive instruction for their work in feeding, scoring stables and so forth. Communities desiring to have campaigns conducted which seek to educate producers, dealers and consumers as to the production of clean, safe milk may make arrangements for these.

3. Extension Work in Poultry Husbandry. — Besides conferences at the college and visits to the plants of poultrymen, giving advice on general poultry management, diseases, mating, laying out and planning buildings, and so forth, this work includes co-operative work with State institutions, county schools of agriculture, agricultural departments in high schools, manual training departments in public and normal schools and exhibits of poultry appliances at fairs and shows.

4. Extension Work in Farm Management, Field Studies and Demonstrations. — This work is carried on co-operatively between the college and the office of farm management of the United States Department of Agriculture at Washington, and consists in studying farm conditions and farm management problems; in instruction in keeping farm accounts, growing field crops; in the use of fertilizer and lime; in giving advice as to farm equipment, buildings, and so forth.

5. Extension Work in Civic Betterment. — This work is carried on in connection with the department of landscape gardening at the college. Assistance is given in all kinds of rural and village improvement enterprises, such as the planting and care of shade and street trees, the planning of playgrounds, school grounds, cemeteries, picnic grounds, the beautifying of water fronts, the rearrangement and development of town commons, reservations of historic interest, and so forth. The co-operation of local granges, men's and women's clubs, village improvement societies and similar organizations is desired.

6. Extension Work in Agricultural Education. — The extension work of this department is devoted to the promotion of agriculture and practical arts relating to country life in the public schools of the State. This is done by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children and the giving of lectures before granges, farmers' clubs, and other organizations interested in this line of endeavor. The work of the agricultural clubs is under the local management of the superintendent of schools or of some one recommended by him. Each town is expected to hold an exhibit of products. Exhibits covering rather extensive districts are incorporated with the various agricultural fairs in the State. In this way the promotion of elementary instruction in agriculture is carried on by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College.

7. Extension Work in Home Economics. — The home economics department stands ready to assist in solving problems relative to the household in the same manner as other departments of the Extension Service do the problems of the farm. The work includes lectures and demonstrations,

assistance in forming girls' clubs and home economics clubs for women, and co-operation with any existing organization in the matter of interesting young people in the proper care of the home.

8. Extension Work in Community Service. — Several communities in the State have appealed to the college for help and advice as to how all the organizations in the community can be brought to a higher state of efficiency, and as to what steps the communities themselves might take toward community development and advancement. The college is now prepared to make scientific studies of communities which lead up, by means of surveys, to the definite organization of committees to study the agricultural, educational, religious, transportation, recreation and civic needs of the communities. Usually several State organizations and some national organizations are brought in to help in working out these plans. Conferences on community affairs are organized and held when requested. The college acts simply in an advisory capacity, the communities themselves doing the actual organizing work.

9. Demonstration Auto Truck. — In order to reach all communities of the State more effectively, a demonstration auto truck has been procured. This truck is equipped with spraying apparatus, pruning tools, Babcock milk tester and other dairy apparatus, dairy record blanks, farm account blanks, a radioptican with sets of pictures for illustrative use, books, bulletins, pamphlets and other equipment. This outfit, in charge of a competent instructor or demonstrator, visits towns and farms of the State upon request, and gives lectures and demonstrations along the lines most interesting to the community.

10. Library Extension Work. — This work consists principally of sending out to the public libraries of the State collections of books and bulletins on agriculture and related subjects. General collections of 10 to 30 books and bulletins are loaned to libraries, also special collections of smaller size on specified subjects, such as fruit growing, dairying, poultry, bees, home economics, etc. These books may be kept for a period of from four to eight weeks, according to the demand for them. The only expense is cost of transportation of the books both ways. The college library also supplies information about books on agriculture and related subjects upon request.

11. Agricultural Surveys. — In order to acquire definite information about existing conditions in rural communities, which may be later used as a basis for further extension work, agricultural surveys are being made as rapidly as possible. The different organizations and officials in the community, such as the town officers, superintendent of schools and teachers, clergymen, librarians and others usually co-operate in making the survey. The survey covers every side of the community life including soil survey, farm management practices, and the educational, social, religious and recreational life. Carefully prepared blanks have been provided on which the inventory is made.

12. Agricultural Co-operation and Marketing. — This department, which is just being started at the college, has for its object the establishment of agriculture on a better business basis. Assistance can be given in the organization of co-operative buying and selling associations, rural credit, the finding of a better market for agricultural produce and other lines of agricultural co-operation.

13. Massachusetts Agricultural College Agricultural Improvement Association. — This is an organization of ex-students of the college

who are farming in the State and who have banded themselves together for the purpose, according to the constitution of the association, of "promoting the agricultural development of the State by carrying on experiments and demonstrations for the betterment of rural pursuits, by using and encouraging the use of better seeds and animals, by the organization of co-operative societies, by the dissemination of literature bearing on recent agricultural investigations," and so forth.

High-grade strains of corn and potatoes are being produced by the members for the Massachusetts seed trade. The growing of alfalfa is now being taken up. Work with animals will soon begin.

14. Demonstration Farms and Plots. — Believing that one of the most effective ways of teaching modern farm practice is by the establishment of demonstrations (not experiments) in all sections of the State, thus showing a man on his own land and under his own conditions the result of proper farm practices, the college is placing demonstration plots throughout the State, showing proper fertilization of grass land and other crops, results of rotations, proper care of orchards and dairy management. For more than three years the Faunce demonstration farm has been under the advisory direction of the college. This farm has proved to the Cape Cod region that small fruits, poultry and vegetables can be successfully grown there. The management of demonstration farms is usually carried on by a committee or board of trustees representing the farm and a committee appointed from the college acting jointly.

15. County or District Agricultural Advisers. — As rapidly as State and government funds are available, men trained in agriculture are being assigned to counties and districts of the State to act as agricultural advisers. Residents of the county or district may, without cost, call upon the adviser for help upon any agricultural subject. The work is being developed through the co-operation of the United States Department of Agriculture, the college and the community engaging the adviser.

16. Student Extension Work. — The social service secretary of the college, in co-operation with the Extension Service, is developing this work. Students of the college, so far as their time will permit, will give lectures and demonstrations on agricultural subjects, teach English and civics to foreigners, coach and supervise athletic contests with boys and girls, help organize and conduct debating societies and Bible classes, give talks on true sportsmanship and clean living, give musical entertainments and act as judges and helpers at fairs and other exhibits.

17. Advisory Work with Institutions and Individuals. — Special effort is made to comply with as many of the requests of State institutions and individuals who ask for advice on farm problems as possible. The force of instructors available for this work is not at present sufficient, and it is hoped a competent man will be engaged in the near future for this work.

18. Publications of the Extension Service. — Beside the regular circulars and bulletins which announce the various short courses and lines of work mentioned, a monthly pamphlet, "Facts for Farmers," giving timely information on agricultural subjects, is issued. Reports of the work of the Extension Service, dairy record blanks, farm account blanks, boys' and girls' club circulars, lists of books, and so forth, can be had upon request.

19. Co-operation with Other Organizations. — The aim of the Extension Service is to co-operate with existing organizations so far as possible. It

is, therefore, glad to help local organizations and welcomes suggestions from such organizations as town officers, local granges, farmers' clubs, women's clubs, Y. M. C. A.'s, Y. W. C. A.'s, boards of trade, village improvement societies, teachers, clergymen, librarians and others interested in agriculture and country life.

20. Information by Correspondence. — Besides these things already mentioned thousands of helpful circulars and bulletins are printed and distributed, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry which always receive the most careful attention from every department of the institution.

Pamphlets and bulletins are sent free to all who ask for them, and correspondence from any who desire such help as has been mentioned is gladly received. Address all communications to the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

General Information.

General Information.

A. FINANCIAL AND ADMINISTRATIVE.

STUDENT EXPENSES.

Tuition.[1] — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $40 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.

Dormitories and Board. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bed rooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present the price of board there is about $4 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

EXPENSES.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts free; other citizens of the United States, $40 a year; foreigners, $120 a year.

	Low.	High.
Room in college dormitories or in private houses,	$39 00	$110 00
Board in college dining hall, $4 a week,	144 00	144 00
Laundry, 50 cents to 85 cents a week,	18 00	30 00
Military uniform, first year,	17 85	17 85
Laboratory fees,	2 00	20 00
Books, stationery and miscellaneous items,	19 15	28 15
	$240 00	$350 00

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students

[1] This statement applies to those registering as regular or unclassified students.

which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $250 and $350 per year.

Initial Charges.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

	Freshmen.	Sophomores.	Juniors and Seniors.
Board (if at college dining hall) four weeks in advance,	$16 00	$16 00	$16 00
Subscription to "Signal" (college paper),[1]	1 50	1 50	1 50
Assessment for support of Social Union,	1 00	1 00	1 00
Laboratory fees: —			
Chemistry,	5 00	–	–
Zoölogy,	–	2 00	–
For elective subjects,	–	–	1 00–10 00
Military uniform,	17 85	–	–
Room rent (if in college dormitory),	–	–	19 50–33 00
Student tax for support of athletics,[1]	8 00	8 00	8 00
	$49 35	$28 50	$47 00–$69 50

[1] While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Signal" is fixed by the managers; the amount of athletic tax by vote of the student body.

Laboratory Fees.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage.

	Per Semester.
Agronomy: —	
Course 3,	$1 50
Course 4,	0 50
Courses 5 and 6,	1 00
Animal husbandry: —	
Courses 2 and 4,	$1 00
Course 7,	2 00

	Per Semester.
Botany: —	
Courses 2, 3, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16,	$3 00
Course 4,	2 00
Course 5,	1 00
Chemistry: —	
Courses 1, 2, 7, 8, 13, 15,	3 00
Courses 3, 4, 5, 6,	4 00
Courses 9, 10, 11, 12, 14, 16,	5 00
Dairying: —	
Courses 1, 2, 3,	1 00
Entomology: —	
Courses 3, 4,	3 00
Landscape gardening: —	
Landscape gardening 1, 2,	2 50
Landscape gardening 3, 4, 7, 8,	3 00
Landscape gardening 6,	1 00
Drawing 1, 2,	2 50
Mathematics: —	
Courses 6, 10,	1 00
Microbiology: —	
All courses, each,	5 00
Pomology: —	
Courses 3, 4,	2 50
Poultry husbandry: —	
Course 3,	1 50
Course 4,	2 00
Zoölogy: —	
Course 1,	2 00
Courses 3, 4,	4 00
Dairying 1, 2, 3, 4,	1 00

STUDENT AID.

Self Help. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and sixty or more students are employed at the dining hall.

Applications for student labor should be made directly to the President. Applicants are required to present statements from parent or guardian and from a selectman or alderman of the town or city in which they reside, showing that the applicant needs assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

Special Notice to Needy Students. — In the last year or two the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

STUDENT ACCOUNTS.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each semester. This rule is strictly adhered to, and no student will be allowed to register in his class until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the semester he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

STUDENT RELATIONS.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the President for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its President or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class

and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

B. COLLEGE ACTIVITIES.

GENERAL EXERCISES.

Chapel exercises are as a rule held four mornings each week. On Wednesday, instead of chapel an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

STUDENT ACTIVITIES.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about six years ago. All students become members of the Union by paying a small fee. The Union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study. In the basement of this building there is also a game room for pool and billiards. In the fall and winter months the Union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of under-graduate conduct, and represents before the faculty the interests of the student body.

The M. A. C. Christian Association is active both socially and religiously. Under its direction voluntary Bible classes are conducted during the winter months. A Catholic Club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A Dramatic Club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and tennis.

A Rifle Club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Signal," published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture and horticulture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Scientific clubs also exist in the departments of French, entomology, landscape gardening, and zoölogy.

C. ACADEMIC AND DEPARTMENTAL.

DEGREES.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

PRIZES.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1913 were: —

Agriculture. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

Animal Husbandry. — The F. Lothrup Ames' Prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live-stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

Botany. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior, junior and sophomore classes as follows: for the best herbarium, $20; for the best collection of Massachusetts trees and shrubs, $15. No collection deemed unworthy of a prize will be considered.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example.

Public Speaking. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declarations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

EQUIPMENT.

Agronomy. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is equipped with apparatus for studying the physical properties of soils, and with tools used in the reclamation of land by drainage and by irrigation. A large part of the work is done in the field, the college farm being used as a laboratory.

Animal Husbandry. — An accurate and definite knowledge of the market types and grades, and of the various breeds of live stock, is fundamental to the work of this department. The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180, and which is fully adapted to the requirements. There are upwards of 125 head of dairy cattle of various ages available for class-room work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Yorkshire pigs are maintained. The college possesses pure-bred Percherons and French coach horses, besides many work teams of different types, which are available for class-room purposes. A set of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different foodstuffs available for the use of the New England farmer, are included in the equipment for this work. This equipment is being added to from time to time as funds are available.

Botany. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement con-

tains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

Chemistry. — The chemical department of the college occupies the entire building previously known as the "old chapel." The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to qualitative and quantitative analysis and organic and physiological chemistry. The second floor is occupied by the general lecture room, by offices for the several members of the staff, by laboratories for physical chemistry and for beginners in quantitative analysis. The third floor has been fitted for work in general chemistry, and has desk room and hoods sufficient to accommodate 66 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 100 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

Dairying. — The dairy department is now using the new dairy building, Flint Laboratory. The dairy work is done in several new laboratory rooms equipped with the best apparatus for market milk and dairy butter work. Flint Laboratory is considered one of the best equipped dairy instruction buildings in the country.

Dining Hall. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college. The building contains a limited number of rooms for young women students.

Drawing. — The class in drawing occupies a room on the second floor of Wilder Hall. It is equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

Entomology. — General Entomological Laboratories. — The equipment for work in entomology is perhaps unexcelled in this country. In

the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped, and it will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room, provided with chemical desks and apparatus, methods for the determination of the impurities and adulterations of insecticides are taught. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

Entomology. — Beekeeping. — For this work the main office, museum and lecture rooms are in the entomological building. There is also an apiary covering approximately two acres which will consist of about fifty colonies of bees in various types of hives and maintained for the several practical and experimental purposes. The apiary also includes a collection of nectar-yielding plants representative of the native flora as well as of the more important nectar sources from other localities. Especial opportunity is therefore given for a study of this fundamental problem of forage. Upon the apiary site is an eight-room building (the first in the world erected exclusively for teaching beekeeping) modeled to meet both the requirements of teaching and of a practical apiary. This building contains a boiler room, capacious wintering cellar, wax extraction room, general carpenter and work shop, laboratory, office, honey extraction room and stock room. The beekeeping equipment also includes an unexcelled collection of apicultural implements, natural history specimens and other curiosities. Practically every device used in American apiculture is available, it being the aim of the department to procure new inventions and implements as fast as they appear for the purpose of study and comparison. Available to the students is a private library of apicultural literature consisting of upwards of 700 volumes and papers, possibly the most complete collection in the country. This entire equipment is acknowledged unique in model and in completeness for the United States and for the world.

Farm Administration. — The college farm of 250 acres is under the general supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

Agricultural Education. — The courses in this department are planned primarily for those who are preparing to teach. The work is carried on by means of lectures, library and demonstrations. The department has an office, lecture room and a laboratory in the Veterinary Science building. The laboratory is equipped with a balance, dishes, jars, reagent bottles, test tubes, petri dishes, lenses, a Babcock test, a Wisconsin sediment test, Bunsen burner, hot and cold water, electricity, gas and other appliances for giving demonstration and practice lessons in Secondary Agriculture. There is also equipment for conducting children's gardens on the campus. Instruction in school gardens constitutes a part of the practice work of those training for the occupation of teaching. Some practice work in teaching is done in the grammar grades of the Amherst schools, and in the agricultural departments of Hopkins' Academy, and Smith's Agricultural School at Northampton. This department is also intimately related to the matter of recommending candidates for teachers' certificates. At least four courses in the department are required of students preparing for such certificate. The office is supplied with school and college reports, also a large number of pamphlets and bulletins relating to the subject of agriculture in the schools, courses of study, etc. See note relative to teachers' certificates, under major in Agricultural Education.

Floriculture. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. There has been erected a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The department of forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants

and seedlings is located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distances of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects.

Geology. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes.

The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

Heating, Lighting and Power. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop and well-equipped carpenter shop.

Landscape Gardening. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

Library. — The library — stack room, reading room and office — occupies the entire lower floor of the Chapel-library building. It contains nearly 42,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular and short-course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.30 A.M. to 9.30 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and laboratory particularly equipped for market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The main floor is used for basket ball, indoor baseball and hand ball. The gallery has been fitted up as a special exercise and gymnastic room, and is equipped with modern developing apparatus, including parallel bars, horses, bucks, chest weights, dumb bells, Indian clubs and striking bags. An outdoor board track enables students to secure track practice through the winter, and two ice hockey rinks give ample opportunity for hockey practice. Credit is given to all students taking part in outdoor activities. "Treks" are held twice a week, and whenever possible snowshoe and skiing hikes are also held. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a shower-room. The gymnasium classes are held the last two hours in the morning and the last two hours in the afternoon, but students may use the gymnasium at other times for exercise purposes

by arrangement with the Department. The regulation costume for class exercise consists of a white track suit and white rubber-sole shoes.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Pomology. — The department of pomology has 20 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There are also two commercial vineyards, and a smaller one in which are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples, plums, pears and peaches, in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1912–13, for instance, apples for class use were received from Idaho, Missouri, Utah, Washington, Maine, Connecticut, Pennsylvania, Montana, Minnesota, Nebraska, Kentucky, Iowa, Wisconsin, Michigan, New York, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrus fruit from Florida and Texas. From the college fruit plantations the following fruits were available: grapes, twenty-four varieties, representing three native American species and several hybrids; six varieties of peaches, ten varieties of pears, eight varieties of plums, forty-six varieties of apples.

Poultry Husbandry. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar, 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a

laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, cramming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; the 6 old experiment station buildings, each 12 by 18 feet, to be used as breeding houses; 14 colony houses, 18 by 30 feet; 8 growing crops; a manure shed, 14 by 18 feet; and an oil house, 10 by 12 feet. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chicken, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

Public Speaking. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests furnish a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollege contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

Veterinary Science. — The department of veterinary science occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — The college offers increased facilities for the study of Zoölogy. In the new building for entomology, zoölogy and geology are capacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. On the second floor is a laboratory, 20 by 32 feet, for advanced work. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes,

microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the departments of entomology and zoölogy-geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 3 floor cases with space for 9 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 6 P.M. The curator is Associate Professor Gordon.

PRIZES AND AWARDS, 1913.

Grinnell Prizes. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, $25, awarded to Allister Francis McDougall.

Second prize, $15, awarded to Stuart Dodds Samson.

Third prize, $10, awarded to Ralph Hicks Gaskill.

Botanical Prizes. — The Hills prizes, given by Henry F. Hills of Amherst; no competition in 1913.

General Improvement. — The Western Alumni Association prize, given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character and example, was awarded as follows: —

Twenty-five dollars to Waldo Atwood Cleveland.

Public Speaking. — The Burnham prizes, given to the students delivering the best and second best declarations, were awarded as follows: —

First prize, $15, awarded to Henry Hyman Kitsis.

Second prize, $10, awarded to Irving Boin Lincoln.

The Flint prizes, given to the students delivering the best and second best orations, were awarded as follows: —

First prize, a gold medal and $20, awarded to Irving Boin Lincoln.

Second prize, $15, awarded to Frederick David Griggs.

Debating. — The prizes in the annual debate were awarded as follows: —

Fifteen dollars and gold medal, awarded to Herbert Augustine Brown.

Fifteen dollars and gold medal, awarded to Frederick William Read.

Fifteen dollars and gold medal, awarded to Charles Holt Gould.

The prizes in the interclass debate were awarded as follows: —

To the team representing the Class of 1916, consisting of Thomas Lincoln Harrocks, Charles Holt Gould and Perez Simmons. This team was awarded a silver cup.

Military Honors. — The following-named cadet officers were reported to the Adjutant-General of the United States army and to the Adjutant-

General of the Commonwealth of Massachusetts, being efficient in military science and tactics and graduating therein with highest honors: —

Cadet Colonel James Dudley French.
Cadet Major Albert Joseph Kelly.
Cadet Major Norman Russell Clark.
Cadet Captain Albert Franklin Edminster.
Cadet Captain John Lawrence Mayer.
Cadet Captain Allister Francis McDougall.

The prize of $100, offered by the New York, New Haven & Hartford Railroad to that student of the Massachusetts Agricultural College, who, during the school year 1912–13, should make the best suggestion of a method by which our system of railroads can co-operate with the Massachusetts Agricultural College for the development of the agricultural possibilities of Massachusetts in particular and New England in general, was awarded to Chester King Allen.

SECRETARIES OF ALUMNI ASSOCIATIONS.

Alumni Secretaries' Association of the Massachusetts Agricultural College.
Secretary: Ralph J. Watts, 1907, Amherst, Mass.

Associate Alumni of the Massachusetts Agricultural College.
Secretary: Charles A. Peters, 1897, Amherst, Mass.

Alumni Club of Massachusetts.
Clerk: H. Linwood White, 1909, 136 State House, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
Secretary: Charles L. Brown, 1894, 870 State Street, Springfield, Mass.

Massachusetts Agricultural College Club of New York.
Secretary: John Ashburton Cutter, 1882, 262 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.
Secretary: Clarence H. Griffin, 1904, 1864 Park Road, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
Secretary: Charles A. Tirrell, 1906, 4012 Perry Street, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
Secretary: Thomas F. Hunt, 1905, Berkeley, Cal.

Class Secretaries.

Class of	Secretary.	Secretary's Address.
1871	E. E. Thompson,	5 Jacques Avenue, Worcester, Mass.
1872	F. E. Kimball,	8 John Street, Worcester, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	D. G. Hitchcock,	Warren, Mass.
1875	M. Bunker,	Newton, Mass.
1876	C. Fred Deuel,	Amherst, Mass.
1877	Atherton Clark,	Newton, Mass.
1878	C. O. Lovell,	5 Bromfield Street, Boston, Mass.
1879	R. W. Swan,	41 Pleasant Street, Worcester, Mass.
1880	Alvan Fowler,	413 Post Office Building, Philadelphia, Pa.
1881	J. L. Hills,	59 North Prospect Street, Burlington, Vt.
1882	G. D. Howe,	25 Winter Street, Bangor, Me.
1883	J. B. Lindsey,	Amherst, Mass.
1884	–	–
1885	E. W. Allen,	1923 Biltmore Street, Washington, D. C.
1886	Dr. Winfield Ayres,	616 Madison Avenue, New York City.
1887	F. H. Fowler,	Shirley, Mass.
1888	H. C. Bliss,	14 Mechanic Street, Attleborough, Mass.
1889	C. S. Crocker,	1003 South 25th Street, Philadelphia, Pa.
1890	David Barry,	398 Walnut Street, Newtonville, Mass.
1891	H. T. Shores,	177 Elm Street, Northampton, Mass.
1892	H. M. Thompson,	Amherst, Mass.
1893	F. A. Smith,	Turner Hill, Ipswich, Mass.
1894	S. F. Howard,	Amherst, Mass.
1895	E. A. White,	Ithaca, N. Y.
1896	A. S. Kinney,	South Hadley, Mass.
1897	C. A. Peters,	Amherst, Mass.
1898	–	–
1899	D. A. Beaman,	Rio Piedras, Porto Rico.
1900	E. K. Atkins,	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass.
1902	H. L. Knight,	1420 Buchanan Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	North Grafton, Mass.
1905	A. D. Taylor,	1101 Tremont Building, Boston, Mass.
1906	Richard Wellington,	Geneva, N. Y.
1907	Clinton King,	6 Beacon Street, Boston, Mass.
1908	J. A. Hyslop,	860 North Mulberry Street, Hagerstown, Md.
1909	O. B. Briggs,	1015 Fidelity Building, Baltimore, Md.
1910	F. L. Thomas,	Amherst, Mass.
1911	L. M. Johnson,	Newtown, Conn.
1912	F. S. Madison,	East Greenwich, R. I.
1913	B. W. Ellis,	Segreganset, Mass.

Degrees Conferred and Roll of Students.

Degrees Conferred — 1913.

Master of Science.

Watkins, John Bedford, Midlothian, Va. Virginia Polytechnic, B.Sc., 1911.

Bachelor of Science (B.Sc.).

Adams, Winford Frederick,	East Leverett.
Allen, Harry Willis,	West Pelham.
Anderson, Oscar Gustaf,	East Pepperell.
Angier, Harris William,	Westborough.
Baird, Harry Albert,	Somerville.
Baker, Dean Foster,	Fairhaven.
Barber, George Ware,	Hyde Park.
Bevan, Laurence Algur,	Newtonville.
Birdsall, Webster Jennings,	Otego, N. Y.
Borden, Ralph James,	Fall River.
Brewer, Charlesworth Herbert,	Mt. Vernon, N. Y.
Brown, Herbert Augustine,	Saxonville.
Bullard, Alvan Henry,	South Framingham.
Burby, Lawrence Walter,	Chicopee Falls.
Bursley, Harold Barrows,	Peabody.
Carver, John Stuart,	Roslindale.
Clark, Norman Russell,	Millbury.
Cobb, Joseph Boyd,	Chicopee Falls.
Cole, Arlin Tower,	West Chesterfield.
Cole, Flora Atwood,	Newton.
Coleman, Isaac,	Amherst.
Cooper, Everett Hanson,	Greenwood.
Cory, Harold,	Rutherford, N. J.
Covill, Joseph Warren,	Roxbury.
Cristman, Clyde Edward,	Dalton.
Culley, Frank Hamilton,	Marshalltown, Ia.
Curtis, Harold William,	Belchertown.
Daniel, Edward Stephen Coen,	Osterville.
Dayton, James Wilson,	Georgetown, Conn.
Dooley, Thomas Patrick,	South Boston.
Drury, Lewis Floyd,	Rutland.
Edminster, Albert Franklin,	Brooklyn, N. Y.
Eisenhaure, John Louis,	North Reading.
Ellis, Benjamin Ward,	Plymouth.
Ells, Gordon Waterman,	Haverhill.
Fay, Robert Sedgwick,	Monson.
Forbush, Wallace Clifford,	Rutland.
French, James Dudley,	Hyde Park.
Gaskill, Ralph Hicks,	Amherst.
Gore, Harold Martin,	Wollaston.
Greenleaf, George Freeman,	Brockton.
Griggs, Frederick David,	Chicopee Falls.
Harris, Burton Adams,	Wethersfield, Conn.
Hasey, Willard Harrison,	Campello.
Hatch, Herbert Tilden,	Atlantic.
Headle, Herbert Wallace,	Bolton.
Headle, Marshall,	Bolton.

Holden, James Loomis, ... Palmer.
Howe, Glover Elbridge, ... Marlborough.
Howe, Ralph Wesley, ... East Dover, Vt.
Huntington, Samuel Percy, ... Lynn.
Hutchings, Herbert Colby, ... South Amherst.
Hyland, Harold Wilson, ... Weymouth.
Jones, Harold Frederic, ... Campello.
Jordan, Simon Miller, ... Rutherford, N. J.
Kelley, Albert Joseph, ... Roxbury.
Kelley, Bernard Jenkins, ... Harwichport.
Kenney, Frederick Alfred, ... Charlestown.
Larsen, Nils Paul, ... Bridgeport, Conn.
Lesure, John Warren Thomas, ... Fitchburg.
Little, Willard Stone, ... Newburyport.
Lowry, Quincy Shaw, ... Canton.
Lyon, Harold, ... Somerville.
Macone, Joseph Augustine, ... Concord.
Mallett, George Alfred, ... Bridgeport, Conn.
Matz, Julius, ... Lynn.
Mayer, John Lawrence, ... South Boston.
McDougall, Allister Francis, ... Westford.
Moir, William Stuart, ... Boston.
Murray, Joseph Wilbur, ... Holyoke.
Neal, Ralph Thomas, ... Mattapan.
Nichols, Norman Joseph, ... Everett.
O'Brien, James Leo, ... Wayland.
Packard, Clyde Monroe, ... Springfield.
Pease, Lester Newton, ... Meriden, Conn.
Pillsbury, Joseph James, ... West Bridgewater.
Post, George Atwell, ... Richmond Hill, N. Y.
Roehrs, Herman Theodore, ... New York, N. Y.
Samson, Stuart Dodds, ... Grand Isle, Vt.
Selden, John Lincoln, ... Northampton.
Serex, Paul, Jr., ... Jamaica Plain.
Sheehan, Dennis Anthony, ... South Lincoln.
Shute, Carl August, ... Quincy, Ill.
Streeter, Charles Marsh, ... Brimfield.
Thayer, Clark Leonard, ... Smith's.
Tucker, Waldo Guy, ... Lynn.
Van Zwaluwenburg, Reyer Herman, ... Rutherford, N. J.
Walker, Charles Dexter, ... Greenwich Village.
Whitney, Francis Wellington, ... Wellesley.
Zabriskie, George, 2d, ... New York, N. Y.

GRADUATE STUDENTS — CANDIDATES FOR A DEGREE.

Ackerman, Arthur John, ... Worcester.
B.Sc., Massachusetts Agricultural College, 1912.
Baird, Charles Glenn, ... Cedar Rapids, Neb.
A.B., University of Kansas, 1911: A.M., University Wyoming, 1913.
Beals, Carlos Loring, ... Sunderland.
B.Sc., Massachusetts Agricultural College, 1912.
Bogue, Robert H., ... North Amherst.
B.Sc., Tufts, 1912.
Bourne, Arthur Isreal, ... Kensington, N. H.
A.B., Dartmouth, 1907.
Brown, Adrian Abbott, ... Waterloo, Wis.
B.Sc., in Agriculture, University of Wisconsin, 1912.
Brown, Henry Leavitt, ... Ayer.
B.Sc., University of Maine, 1913.
Copson, Godfrey Vernon, ... Grand Rapids, Mich.
B.Sc., in Agriculture, Oregon Agricultural College, 1911.
Davies, Ernest Langford, ... Toronto, Can.
B.Sc., in Agriculture, Toronto University, 1913.

Fiske, Raymond John, ... Stoneham.
B.Sc., Massachusetts Agricultural College, 1910.
Fowler, George Scott, ... Wayland.
B.Sc., Massachusetts Agricultural College, 1912.
Georgia, Bert Cyrenius, ... Ithaca, N. Y.
B.Sc., Cornell University, 1913.
Hillary, Walter Hoxie, ... Philadelphia, Pa.
B.S., Pennsylvania State College, 1913.
Holland, Edward Bertram, ... Amherst.
M.S., 1892, Massachusetts Agricultural College.
Hutson, John Coghlan, ... Bridgetown, Barbados.
B.A., Oxford University, England, 1909.
Itano, Arao, ... Okayamaken, Japan.
B.Sc., Michigan Agricultural College, 1911.
Lund, Russell Fort, ... West Pelham.
B.A., St. Lawrence University, 1909.
Mackan, Charles R., ... Portsmouth, Va.
B.S., Virginia Polytechnic, 1911.
McLaughlin, Frederick Adams, ... Lee.
B.Sc., Massachusetts Agricultural College, 1911.
Martin, James Francis, ... Amherst.
B.Sc., Massachusetts Agricultural College, 1912.
Norton, John Buck, ... Hartford, N. Y.
B.Sc., University of Vermont, 1913.
Noyes, Harry Alfred, ... Lafayette, Ind.
B.S., 1912, Massachusetts Agricultural College.
Parker, Ralph Robinson, ... Penikese.
B.Sc., Massachusetts Agricultural College, 1912.
Robinson, Harold Averill, ... Elmwood, N. H.
B.Sc., New Hampshire State College, 1913.
Ruprecht, Rudolph William, ... Brooklyn, N. Y.
B.Sc., Rhode Island Agricultural College, 1911.
Sanctuary, William Crocker, ... Amherst.
B.Sc., Massachusetts Agricultural College, 1912.
Serex, Paul, Jr., ... Bloomfield, N. J.
B.Sc., Massachusetts Agricultural College, 1913.
Shoeman, Nichols Henry, ... Cesaria, Turkey.
Harpoot, Turkey, Euphrates College, 1907.
Smith, Raymond Goodale, ... Lynn.
B.Sc., Massachusetts Agricultural College, 1911.
Smulyan, Marcus Thomas, ... Amherst.
B.Sc., Massachusetts Agricultural College, 1909.
Strand, Carl John, ... Brattleboro, Vt.
A.B., Augustana College, 1907; M.A., University Illinois, 1908.
Thayer, Clark Leonard, ... Enfield.
B.Sc., Massachusetts Agricultural College, 1913.
Thomas, Frank Lincoln, ... Athol.
B.Sc., Massachusetts Agricultural College, 1910.
Tower, Daniel Gordon, ... Roxbury.
B.Sc., Massachusetts Agricultural College, 1912.

GRADUATE STUDENTS — CANDIDATES FOR NO DEGREE.

Chamberlain, Edwin Martin, ... Cambridge.
A.B., Harvard, 1911.
Martindale, Henrietta, ... LaCrosse, Wis.
A.B., Smith, 1913.
McBurney, Henry, ... Amherst.
B.S., Massachusetts Institute Technology.
Patton, Hamilton, ... Highland Park, Ill.
B.A., Amherst, 1913.
Toppan, Cushing, ... Cambridge.
A.B., Harvard, 1908.
Whittier, Warren Faxon, ... Amherst.
A.B., Harvard, 1909.
Wright, David Sanderson, ... Northampton.
B.A., Amherst College, 1909.

Roll of Students.

Senior Class.

Abbott, Leslie Elmer,	Sandwich,	10 North College.
Allen, Carl Murdough,	Holyoke,	16 South College.
Baker, Warren Sears,	Wollaston,	9 South College.
Black, Harold Cotting,	Falmouth,	96 Pleasant Street.
Blake, Ralph Cedric,[1]	Wollaston,	6 South College.
Bokelund, Chester Story,[1]	Worcester,	2 South College.
Bradley, John Watling,	Groton,	3 South College.
Bragg, Ralph Stanley,[1]	Milford,	96 Pleasant Street.
Brewer, Harold William,[1]	Mount Vernon, N. Y.,	1 South College.
Brooks, Arthur Winslow,	Smith's,	4 South College.
Brown, Harry Dunlap,	Lowell,	96 Pleasant Street.
Calvert, Melville Bradford,	New London, Conn.,	1 North College.
Campbell, Malcolm David,[1]	Still River,	3 North College.
Christie, Edward Wheeler,	North Adams,	2 North College.
Churchill, George Clarence,	Worcester,	58 Pleasant Street.
Clark, Ernest Samuel, Jr.,	Tolland,	15 North College.
Clay, Harold Johnson,	Cambridge,	16 South College.
Clegg, Frank Jackson,[1]	Fall River,	1 South College.
Coleman, David Augustus,	South Framingham,	3 North College.
Davies, Lloyd Garrison,	Peabody,	14 South College.
Davis, Ralph Edward,	Southbury, Conn.,	13 North College.
Davis, William Ashmun,	Northfield,	11 North College.
Dearing, Newton Howard,[1]	Brookline,	8 South College.
Dexter, Evans King,[1]	Mattapoisett,	Tower.
Dunbar, Erving Walker,	North Weymouth,	116 Pleasant Street.
Edgerton, Almon Morley,	Mittineague,	12 South College.
Edwards, Edward Clinton,[1]	North Beverly,	16 South College.
Eldridge, Harold Lockwood,[1]	Wareham,	Tower.
Foster, Stuart Brooks,[1]	West Somerville,	96 Pleasant Street.
Freeborn, Stanley Barron,	Ware,	10 South College.
Freedman, Samuel Leavitt,[1]	Roxbury,	12 North College.
Frye, Carl Raymond,[1]	South Hadley Falls,	Kappa Gamma Phi.
Fuller, George,	Deerfield,	19 Phillips Street.
Hadfield, Harold Frederic,	North Adams,	Kappa Gamma Phi.
Handy, Ralph Ellis,	Cataumet,	10 North College.
Harris, Rodney Wells,	Wethersfield, Conn.,	87 Pleasant Street.
Hazen, Edward Leonard,	Springfield,	96 Pleasant Street.
Hebard, Emory Blodgett,	Holland,	14 North College.
Heffron, Frederick,	Sherborn,	4 North College.
Hill, Charles Chase,[1]	Melrose Highlands,	Pease Avenue.
Hogg, Lawrence Jager,[1]	Lawrence,	9 North College.
Howard, Lewis Phillips,	North Easton,	16 North College.
Hutchinson, John Gouverneur,	Arlington,	14 South College.
Ingham, Earl Morris,	Granby,	19 Phillips Street.
Jacobs, Loring Humphrey,[1]	Wellesley,	25 Pleasant Street.
Jenny, Herbert Hedge,[1]	South Boston,	6 Nutting Avenue.
Jones, Dettmar Wentworth,[1]	Melrose,	10 South College.
Leete, Richard Fowler,	Mt. Kisco, N. Y.,	81 Pleasant Street.

[1] Work incomplete.

Levine, Henry Walter,[1]	Roxbury,	12 North College.
Lincoln, Murray Danforth,	Raynham,	16 North College.
Lucas, Hoyt Dennis,	Springfield,	8 Allen Street.
Major, Joseph,	East Rutherford, N. J.,	58 Pleasant Street.
Marsh, Frank Eugene,[1]	Jefferson,	90 Pleasant Street.
Merkle, Frederick Grover,	Amherst,	North East Street.
Morrison, Harold Ivory,	Melrose,	66 Pleasant Street.
Morse, Harold John,	Townsend,	3 South College.
Needham, Lester Ward,	Springfield,	96 Pleasant Street.
Nicolet, Theodore Arthur,[1]	Fall River,	85 Pleasant Street.
Nicolet, Tell William,	Fall River,	85 Pleasant Street.
Nissen, Harry,	Boston,	85 Pleasant Street.
Norton, Leslie Howard,	Newport, R. I.,	4 South College.
Nute, Raymond Edson,	Fall River,	North College.
O'Brien, Daniel William,[1]	Wayland,	6 North College.
Oertel, John Thomas,[1]	South Hadley Falls,	116 Pleasant Street.
Parker, Ervine Franklin,[1]	Poquonock, Conn.,	96 Pleasant Street.
Payne, Roland Alfred,	Wakefield,	North Amherst.
Pellett, John Doubleday,	Worcester,	3 South College.
Peters, Chester Harry,	Clinton,	Physics Building.
Petersen, Peveril Oscar,	Concord,	4 North College.
Porter, Bennett Allen,	Amherst,	11 North College.
Powers, Richard Henry,[1]	Malden,	7 South College.
Read, Frederick William,	Boston,	2 South College.
Reid, George Alexander,[1]	Worcester,	French Hall.
Russell, Alden Hesseltine,	Watertown,	14 North College.
Sahr, Gabriel William Arthur,[1]	Boston,	15 Phillips Street.
Sherman, Joel Powers,	Hyannis,	8 South College.
Small, Francis Willard,	North Truro,	Flint Laboratory.
Smith, Leon Edgar,	Boston,	85 Pleasant Street.
Smith, Leone Ernest,	Leominster,	15 North College.
Stevens, Arthur Eben,	Lawrence,	South College.
Strange, Sarah Josephine,	Marshfield,	Draper Hall.
Tarbell, Munroe Gifford,	Brimfield,	10 North College.
Taylor, Arthur Wright,[1]	Feeding Hills,	116 Pleasant Street.
Taylor, Leland Hart,	Peabody,	15 South College.
Thurston, Arthur Searle,	Everett,	Beta Kappa Phi.
Tower, Alfred Leigh,	Sheffield,	Entomological Building.
Tupper, Arthur Somerville,[1]	Roxbury,	85 Pleasant Street.
Upton, Ernest Franklin,[1]	Salem,	13 South College.
Walker, Nathaniel Kennard,	Malden,	88 Pleasant Street.
Walker, Raymond Philip,	Taunton,	88 Pleasant Street.
Warner, Raymond Winslow,	Sunderland,	9 South College.
Webster, Louis Armstrong,	Blackstone,	16 North College.
Weigel, Arthur George,	Lawrence,	9 North College.
Wheeler, Chester Eaton,	Lowell,	87 Pleasant Street.
Whidden, Burton Clark,	Lowell,	81 Pleasant Street.
Whippen, Charles Warren,	Lynn,	2 North College.
Wing, John Govan,	Somerville,	116 Pleasant Street.
Wood, Henry Joseph,	Mendon,	82 Pleasant Street.

JUNIOR CLASS.

Alden, Charles Harold,[1]	Amherst,	East Pleasant Street.
Allen, Francis Ellwood,	Melrose,	10 Allen Street.
Anderson, Herbert Henry,	Ware,	5 Nutting Avenue.
Archibald, Herbert Hildreth,	Waltham,	11 South College.
Banister, Seth Warrener,[1]	Westford,	82 Pleasant Street.
Bartlett, Edward Russell,	Newburyport,	3 Nutting Avenue.
Bartley, Hastings Newcomb,[1]	Sandwich,	6 South College.
Bemis, Willard Gilbert,[1]	North Brookfield,	12 Cottage Street.
Bennett, John Ingram,[1]	Dorchester,	66 Pleasant Street.

[1] Work incomplete.

Bishop, Chester Allen,[1]	Peterboro, N. H.,	85 Pleasant Street.
Brooks, Gardner Milton,[1]	Boston,	8 Allen Street.
Buell, Frank Weed,[1]	Clinton, Conn.,	5 South College.
Buttrick, John Willard,	Melrose,	18 Nutting Avenue.
Cale, Gladstone Hume,	Springfield,	Beta Kappa Phi.
Cande, Donald Hopkins,[1]	Pittsfield,	87 Pleasant Street.
Chase, Alexander Baxter, Jr.,	West Barnstable,	Clark Hall.
Clark, Ellis Fred,	Granby, Conn.,	North College.
Cleveland, Waldo Atwood,[1]	Baldwinsville,	Veterinary Laboratory.
Clough, Maurice Joseph,[1]	Boston,	7 South College.
Cole, Herbert Elmer,[1]	Manchaug,	Plant House.
Dalrymple, Andrew Campbell,	Revere,	3 McClellan Street.
Damon, Leon Blanchard,[1]	Melrose,	18 Nutting Avenue.
Day, George Allen,[1]	Warren,	12 Cottage Street.
Dole, Sumner Alvord,	Bardwell's Ferry,	11 North College.
Donnell, George Edwin,	Burlington,	East Experiment Station.
Doran, William Leonard,	North Dartmouth,	Beta Kappa Phi.
Draper, Earle Sumner,	Milford,	85 Pleasant Street.
Farrar, Stuart Kittredge,[1]	Springfield,	96 Pleasant Street.
Fitzgerald, Daniel James,[1]	Worcester,	Kappa Gamma Phi.
Flebut, Alpha John,	Amherst,	27 McClellan Street.
Frost, Robert Theodore,[1]	New York, N. Y.,	85 Pleasant Street.
Fuller, Richard,[1]	Salem,	16 South College.
Goodwin, Malcolm Noyes,	Newburyport,	96 Pleasant Street.
Grant, Harold Davidson,	Methuen,	3 McClellan Street.
Griggs, Raymond Bradford,[1]	Chicopee Falls,	15 South College.
Hall, George Morris,[1]	Brookline,	85 Pleasant Street.
Hall, Roderick Chesley,	Worcester,	Beta Kappa Phi.
Harper, James Edward,[1]	New Haven, Conn.,	Kappa Gamma Phi.
Harvey, Russell Wilton,[1]	Lanesville,	44 Pleasant Street.
Haskell, Willis Henry, Jr.,[1]	Brooklyn, N. Y.,	116 Pleasant Street.
Hatfield, William Hollis,[1]	Wellesley,	87 Pleasant Street.
Hildreth, Paul Hughes,[1]	Newtonville,	12 South College.
Hotis, Ralph P.,	Evans Mills, N. Y.,	21 Amity Street.
Hyde, George Frederick,	North Dana,	Beta Kappa Phi.
Hyde, Harold Gilmore,	Winchendon,	36 North Prospect Street.
Johnson, Arthur,	Bridgeport, Conn.,	7 South College.
Johnson, Rollin Eugene,[1]	Templeton,	6 Phillips Street.
Kelleher, Jerome Joseph,	Montague City,	75 Pleasant Street.
Kennedy, Worthington Chester,	Hardwick,	6 North College.
Lane, Merton Chesleigh,	South Duxbury,	Mathematics Building.
LeDuc, Ashley Cudworth,	Chesterfield,	5 Nutting Avenue.
Lewis, Daniel James,	Hanson,	96 Pleasant Street.
Lewis, John Kirby,	New Haven, Conn.,	Care of Mr. E. M. Dickinson.
Lincoln, Irving Boin,[1]	Glens Falls, N. Y.,	94 Pleasant Street.
Lovejoy, John Sumner,[1]	Newburyport,	53 Lincoln Avenue.
MacNeil, Ralph Langdel,[1]	Chelsea,	52 Amity Street.
Macy, Philip Arthur,[1]	Oak Bluffs,	53 Lincoln Avenue.
Marsh, Franklin Winter,[1]	Amherst,	18 Nutting Avenue.
Marsh, Herbert Vener,	Deerfield,	Beta Kappa Phi.
Masse, Sidney Merton,[1]	Dorchester,	6 Nutting Avenue.
McKechnie, Ray Farrar,[1]	Natick,	Kappa Gamma Phi.
McLain, Ralph Emerson,[1]	Melrose,	5 South College.
Melican, George Deady,[1]	Worcester,	75 Pleasant Street.
Moberg, Eldon Samuel,[1]	Campello,	7 North College.
Montague, Enos James,	Northampton,	North College.
Moore, Roger Henry,[1]	Beverly,	6 Nutting Avenue.
Navas, Miguel,[1]	Barranquilla, Col., S. A.,	6 Phillips Street.
Parker, Edwin Kenney,[1]	Northampton,	East Experiment Station.
Parmenter, Ernest Brigham,[1]	Dover,	Beta Kappa Phi.
Patterson, Robert Earley,[1]	Dorchester Center,	75 Pleasant Street.
Pendleton, Harlow Libby,[1]	Dorchester,	Flint Laboratory.

[1] Work incomplete.

Perry, Gerald Eugene,	Amherst,	17 Amity Street.
Pike, Joseph Stevens, Jr.,[1]	Somerville,	3 Nutting Avenue.
Potter, George Raymond,[1]	Ludlow,	44 Pleasant Street.
Price, James Albert,	New York, N. Y.,	11 South College.
Rhoades, Paul Whitney,[1]	Malden,	66 Pleasant Street.
Rogers, Harold Merriman,	Southington, Conn.,	87 Pleasant Street.
Sauchelli, Vincent,	Waterbury, Conn.,	11 High Street.
Sears, William Richard,	Woburn,	6 South College.
Severance, Verne Lincoln,	South Hanson,	Mathematics Building.
Sherman, Milton Francis,	South Lincoln,	10 Allen Street.
Simon, Isaac Barney,	Revere,	38 Cottage Street.
Slein, Owen Francis,	New Braintree,	127 South Pleasant Street.
Smith, Hyde,[1]	Worcester,	12 North College.
Spicer, Eber Grant,	Poughkeepsie, N. Y.,	44 Triangle Street.
Spofford, Chester Porter,[1]	Georgetown,	Kappa Gamma Phi.
Taft, Richard Craig,[1]	Oxford,	88 Pleasant Street.
Tarr, Lester Winslow,	Rockport,	Beta Kappa Phi.
Tower, Ralph Ernest,	Becket,	120 Pleasant Street.
Tower, William Reginald,	Sheffield,	94 Pleasant Street.
Towne, Edwin Chester,[1]	Waltham,	85 Pleasant Street.
Upton, Raymond Melville,	Peabody,	Plant House.
Vener, Benjamin,	Brockton,	38 Cottage Street.
Vinal, Stuart Cunningham,	Boston,	8 Allen Street.
Wellington, Benjamin,	Waltham,	15 Phillips Street.
White, Henry Harrison,	West Peabody,	Beta Kappa Phi.
White, Homer Beethoven,[1]	Melrose Highlands,	Apiary.
Whitmore, Philip Ferry,	Sunderland,	88 Pleasant Street.
Whorf, Paul Francis,[1]	Boston,	87 Pleasant Street.
Wilkins, Alfred Emerson,[1]	Wakefield,	116 Pleasant Street.
Willey, Harold Cleland Clancey,[1]	Orange,	Plant House.
Williams, Donald,[1]	Catasauqua, Pa.,	85 Pleasant Street.
Wright, Elvin Stanley,	Worcester,	88 Pleasant Street.

Sophomore Class.

Aiken, Harold,	Millis,	42 McClellan Street.
Allen, Chester King,	Quincy,	82 Pleasant Street.
Anderson, Frank Albert,	Somerville,	13 Phillips Street.
Andrews, Francis Marshall, Jr.,[1]	Manchester,	53 Lincoln Avenue.
Baker, Roland Sears,[2]	Brooklyn, N. Y.,	– –
Barnes, Dwight Fletcher,[1]	Marshfield,	30 North Prospect Street.
Barnes, Fred Leslie,[1]	Plymouth,	Entomological Building.
Bartlett, Emory Haynes,	Boston,	12 Cottage Street.
Beeler, Leon Charles,[1]	Adams,	Kappa Gamma Phi.
Betsch, William Carter,[1]	New York, N. Y.,	60 Pleasant Street.
Bisbee, Philip Emerson,[1]	Waitsfield, Vt.,	1 South College.
Bishop, Herbert Walker,[1]	Doylestown, Pa.,	85 Pleasant Street.
Blanpied, Nelson Uhler,	Framingham,	M. A. C. Farm House.
Boyer, Edward Everett Hale,[1]	Lynn,	8 North Prospect Street.
Brazil, William Henry,	Leominster,	116 Pleasant Street.
Burt, Helen Francis,	West Somerville,	Draper Hall.
Caldwell, Harold Nute,[1]	Lowell,	M. A. C. Farm House.
Cardarelli, Emilio Joseph,	Boston,	West Experiment Station.
Carver, Frank Whitney,[1]	Plymouth,	Care of Professor Morton.
Cederstrom, Hjalmar,[2]	Dorchester,	– –
Chamberlin, Raymond,[1]	New York, N. Y.,	85 Pleasant Street.
Chase, Esther Helen,[1]	Holden,	Draper Hall.
Chisholm, Raymond Lincoln,	Melrose Highlands,	15 Beston Street.
Clapp, Raymond Luckey,	Northfield,	Care of Mr. Julian.
Clough, Charles Henry,[1]	Dedham,	15 Beston Street.
Coleman, Albert Sumner,[1]	Mendon,	82 Pleasant Street.
Coley, William Stanton,[1]	Wilton, Conn.,	87 Pleasant Street.

[1] Work incomplete.

[2] Entered in February, 1913, left September, 1913.

Courchene, Alcide Telesphor,[1]	North Adams,	Kappa Gamma Phi.
Curran, Harry Ambrose,	Marlborough,	Kappa Gamma Phi.
Curtin, Charles Warren,	Auburndale,	36 North Prospect Street.
Cushing, Raymond Alonzo,[1]	Somerville,	13 Phillips Street.
Danforth, George Newlin,[1]	Foxcroft, Me.,	96 Pleasant Street.
Darling, Homer Chester,	Mendon,	9 South College.
Davis, Frank Leslie,[1]	Hopedale,	North Pleasant Street.
Dickinson, William Cowls,	North Amherst,	North Amherst.
Dinsmore, Donald Sanderson,	Springfield,	88 Pleasant Street.
Dodge, Walter Eugene,	Geneva, O.,	14 Phillips Street.
Doggett, William Henry,	Dedham,	35 East Pleasant Street.
Duffill, Edward Stanley,[1]	Boston,	8 Allen Street.
Eldredge, Raymond Chase,	North Abington,	30 North Prospect Street.
Estes, Ralph Cary,	South Framingham,	116 Pleasant Street.
Fernald, Charles Henry, 2d,	Amherst,	44 Amity Street.
Fielding, Lester Edward,[1]	Malden,	96 Pleasant Street.
Fisher, George Basil,[1]	Millbury,	88 Pleasant Street.
Gaventa, Harry Reymer,	Swedesboro, N. J.,	Brooks Farm.
Gilmore, Benjamin Anthony,[1]	Acushnet,	40 Amity Street.
Gioiosa, Alfred Anthony,	Dorchester,	8 North College.
Glover, Theodore Whitford,[1]	South Duxbury,	Care of S. J. Wright.
Goodwin, Clinton Foster,	Haverhill,	82 Pleasant Street.
Googins, Burton,	Brooklyn, N. Y.,	96 Pleasant Street.
Gould, Charles Holt,	Worcester,	88 Pleasant Street.
Gunn, Carlton Merrick,	Sunderland,	Beta Kappa Phi.
Hager, Clayton Marden,	Winter Hill,	87 Pleasant Street.
Hall, Stanley William,	Saxonville,	Brooks Farm.
Harris, William Lombard, Jr.,	Deerfield,	53 Lincoln Avenue.
Harrocks, Thomas Lincoln,	Westminster,	21 Fearing Street.
Hart, Reginald,	Montague City,	53 Lincoln Avenue.
Haskell, Frank Eugene,	Northborough,	Mt. Pleasant.
Hathaway, Charles Edward, Jr.,[1]	Somerset,	87 Pleasant Street.
Hemenway, Justin Stanley,	Williamsburg,	Brooks Farm.
Hendry, Arthur Ekman,[1]	Milton,	18 Nutting Avenue.
Hicks, Albert James,[1]	Amherst,	Brooks Farm.
Holden, Mae Faustina,	Royalston,	President's House.
Hunt, Reginald Stuart,[1]	Bridgewater,	8 South Prospect Street.
Huntington, Charles Albert, Jr.,	Poquonock, Conn.,	96 Pleasant Street.
Jerome, Frederick William,[1]	Stockbridge,	40 Amity Street.
Jones, Linus Hale,[1]	Milford,	Care of Mr. Green.
Jordan, Perley Black,	Topsfield,	16 South College.
Kelly, Harold Russell,[1]	Haverhill,	11 Gaylord Street.
Kilbon, Ralph Gillette,[1]	Springfield,	Brooks Farm.
King, Edward Lee,	Dorchester,	8 South College.
Knapton, Guy Lord,	Lawrence,	Pease Avenue.
Laird, Kenneth Bradford,	Brockton,	Beta Kappa Phi.
Lamoureux, Domina Joseph,[1]	Adams,	Kappa Gamma Phi.
Lieber, Conrad Hugo,	Jamaica Plain,	Kappa Gamma Phi.
Lindquist, Albert Evert,[1]	Jamaica Plain,	Physics Laboratory.
Little, Harold Greenleaf,	Newburyport,	5 North College.
Locke, Wilbur Trow,	Lawrence,	36 North Prospect Street.
Lyford, Waldo Preston,[1]	Natick,	52 Lincoln Avenue.
Mahan, Harold Butterworth,[1]	Boston,	Kappa Gamma Phi.
Mahony, William John,[1]	Winthrop,	10 South College.
Mason, Julius Stevens,[1]	Hanover, N. H.,	77 Pleasant Street.
Mattoon, Harold Gleason,[1]	Pittsfield,	116 Pleasant Street.
McCulloch, Norman Estes,	Pawtucket, R. I.,	96 Pleasant Street.
Mooney, Raymond Alson,[1]	Plattsburgh, N. Y.,	6 Tilson Court.
Moses, Charles Wicker,	Ticonderoga, N. Y.,	96 Pleasant Street.
Moss, Earle Chester,[1]	Worcester,	83 Pleasant Street.
Mostrom, Harold Augustus,	North Middleborough,	Care of Mr. Watts.
Murphy, John William,	Beverly,	15 Beston Street.

[1] Work incomplete.

Nash, Clayton Wells,	South Weymouth,	5 Sunset Avenue.
Nicholson, James Thomas,[1]	Leominster,	116 Pleasant Street.
Noyes, Samuel Verne,	Georgetown,	Beta Kappa Phi.
O'Brion, Edwin Fulton,	Somerville,	31 North Prospect Street.
Palmer, George Bradford,	Brookline,	96 Pleasant Street.
Pease, Willard Noah Morris,[1]	Amherst,	Brooks Farm.
Perry, Edgar Adams,	Attleborough,	21 Amity Street.
Phelps, Sanford Wallace, Jr.,[1]	Turners Falls,	68 Pleasant Street.
Plaisted, Philip,	Arlington,	15 Beston Street.
Potter, David,	Concord,	40 Amity Street.
Pratt, Walter Howard,[1]	Dalton,	M. A. C. Farm House.
Prouty, Stanley Marshall,	North Brookfield,	96 Pleasant Street.
Ray, George Burrill,	Hingham,	Kappa Gamma Phi.
Reed, Andrew John, Jr.,[1]	Dalton,	M. A. C. Farm House.
Rich, Gilbert Warren,	Hingham,	Care of Professor Morton.
Richards, Everett Stackpole,	Northampton,	96 Pleasant Street.
Richardson, Lewis Elmer,[1]	Rockville,	42 McClellan Street.
Rieker, Dean Albert,	Worcester,	85 Pleasant Street.
Rogers, Tyler Stewart,	Saxonville,	M. A. C. Farm House.
Rowe, Louis Victor,[1]	Melrose,	18 Nutting Avenue.
Russell, Ernest Samuel,[1]	Hadley,	96 Pleasant Street.
Ryan, William Edward, Jr.,[1]	Stoughton,	52 Amity Street.
Sander, Benjamin Charles Louis,[1]	Cambridge,	Brooks Farm.
Sanderson, Everett Shovelton,	Centreville, R. I.,	Nutting Avenue.
Saunders, William Putman,	Lawrenee,	116 Pleasant Street.
Sauter, William Hugo,[1]	Turners Falls,	60 Pleasant Street.
Scheufele, Frank Joseph,	South Natiek,	15 Beston Street.
Schlotterbeek, Lewis,	Roxbury Station, Conn.,	85 Pleasant Street.
Schwartz, Louis,[1]	Melrose,	West Experiment Station.
Sherinyan, Suran Donald,	Woreester,	35 North Prospect Street.
Simmons, Perez,	Pittsfield,	21 Fearing Street.
Smith, Philip Lawrence,[1]	Kingston,	52 Amity Street.
Stanford, Ernest Elwood,	Amherst,	4 Walnut Street.
Stearns, Frederick Campbell,[1]	Birmingham, Ala.,	40 Amity Street.
Stoughton, Richard,[1]	Montague,	21 Fearing Street.
Strauss, Abraham,	Boston,	101 Pleasant Street.
Swan, Durelle,	Dorehester,	18 Nutting Avenue.
Taber, Ralph Fred,	Cooperstown, N. Y.,	Mt. Pleasant.
Tarbell, Herbert Hitchcock,	Warren,	88 Pleasant Street.
Topham, Alfred,	Lawrenee,	116 Pleasant Street.
Upham, Thomas Carlton,	Fitchburg,	53 Lincoln Avenue.
Verbeek, Howard Graves,	Malden,	Care of Mr. Green.
Walkden, Herbert Halden,	Westford,	Brooks Farm.
Walker, Henry Marshall,[1]	Brookline,	Brooks Farm.
Wells, Harry Andrew,[1]	Dalton, Pa.,	75 Pleasant Street.
Wentworth, Everett Lawrence,	East Dover, Vt.,	Wilder Hall.
Wetherbee, Raymond Swift,	Waltham,	Beta Kappa Phi.
Whitney, Harold Tichenor,[1]	Mt. Vernon, N. Y.,	8 North College.
Whitney, Leon Bradley,	Brooklyn, N. Y.,	96 Pleasant Street.
Wies, Calmy,[1]	Malden,	38 Cottage Street.
Wilcox, Timothy Palmer,	Andover,	7 North College.
Wildon, Garrick Earl,[1]	Melrose Highlands,	66 Pleasant Street.
Zehrung, Samuel Danford,[1]	Roseville, O.,	120 Pleasant Street.

Freshman Class.

Adams, Henry Leo,[1]	Newburyport,	Brooks Farm.
Alcott, William Jefferson,[1]	Everett,	25 Pleasant Street.
Andrews, Robert Morton,	South Carver,	88 Pleasant Street.
Armstrong, James,	North Adams,	–
Avery, Hazelton Small,[1]	San Juan, P. R.,	66 Pleasant Street.
Babcock, Philip Rodney,[1]	Lynn,	75 Pleasant Street.

[1] Work incomplete.

Baer, Richard Moorehead,	Wellesley Farms,	6 Phillips Street.
Barnes, Herbert Wesley,	Whitinsville,	31 North Prospect Street.
Behrend, Oswald,	Natick,	29 McClellan Street.
Bell, Alfred Whitney, Jr.,[1]	West Newton,	40 Amity Street.
Bevan, Kenneth Charles,	Newtonville,	31 East Pleasant Street.
Birchard, John Dickson,	Springfield,	83 Pleasant Street.
Boles, Robert Stewart,[1]	Dorchester,	67 Pleasant Street.
Bonn, Wesley Copeland,	Grafton,	5 Nutting Avenue.
Booth, Alfred,[1]	Middletown, N. Y.,	Care of Professor Morton.
Borden, Raymond Vincent,[1]	Fall River,	15 Fearing Street.
Bowen, David Jennings,	North East, Pa.,	12 Cottage Street.
Boyce, Harold Prescott,	Haverhill,	7 Nutting Avenue.
Boyd, Robert Lucius,[1]	Lynn,	Care of E. F. Gaskill.
Brainard, Dwight Gay,[1]	Dorchester,	35 East Pleasant Street.
Breck, Richard Winslow,[1]	Boston,	31 East Pleasant Street.
Breckenridge, Earl,	Lynn,	Care of E. F. Gaskill.
Brown, Frederick Ward,[1]	Scituate,	31 North Prospect Street.
Buchanan, Walter Gray,	Chicopee,	97 Pleasant Street.
Buck, Rollin Hugh,	Worcester,	56 Pleasant Street.
Buckman, Lewis Taylor,	Wilkes-Barre, Pa.,	Prospect House.
Burleigh, Arthur Leslie,[1]	Lynn,	75 Pleasant Street.
Buttrick, Herbert David,	Arlington,	79 Pleasant Street.
Cate, Rex March,	Faneuil,	3 Nutting Avenue.
Chamberlain, Sumner Fiske,[1]	Holden,	56 Pleasant Street.
Choate, Carlisle Edward,	Framingham,	53 Lincoln Avenue.
Clark, Walter Thompson,[1]	Granby,	120 Pleasant Street.
Cotton, Elwyn Page,	Woburn,	81 Pleasant Street.
Cross, Walter Irving,	Hingham,	53 Lincoln Avenue.
Davis, Monsell Henry,	Orange, N. J.,	Care of S. J. Wright.
Dawson, Harry Custer,	Tewksbury,	29 North Prospect Street.
Day, James Harold,	Hatfield,	Brooks Farm.
DeMerritt, Franklin,	Watertown,	3 Fearing Street.
DeMott, Harold Edward,[1]	Brooklyn, N. Y.,	50 Lincoln Avenue.
Dempsey, Paul Wheeler,	Dorchester,	53 Lincoln Avenue.
Dick, Robert Edmundston,	Barre,	– –
Dickey, Harold Gammell,	Dorchester Center,	18 Nutting Avenue.
Dizer, John Thomas,[1]	East Weymouth,	35 East Pleasant Street.
Doherty, Paul Edward,[1]	Fall River,	85 Pleasant Street.
Doll, Otto Henry,[1]	Adams,	35 East Pleasant Street.
Donovan, Frank Edward,	Turners Falls,	– –
Dowd, William Lawrence,	North Amherst,	North Amherst.
Dudley, Lofton Leland,	Long Branch,	36 North Prospect Street.
Dumas, Walter Branca,[1]	Boston,	35 East Pleasant Street.
Dunham, Henry Gurney,	West Bridgewater,	79 Pleasant Street.
Dunham, Kenneth Herbert,	North Bennington, Vt.,	34 North Prospect Street.
Dunn, Arthur Paul,	Malden,	35 East Pleasant Street.
Edwards, Francis Gill,	North Beverly,	13 South College.
Elliot, Ralph William,	Chartley,	12 Cottage Street.
Everbeck, George Charles,[1]	Winthrop,	25 Pleasant Street.
Farwell, Alfred Austin,	Turners Falls,	79 Pleasant Street.
Favor, Richard William,	Somerville,	29 North Prospect Street.
Fearing, Ralph Watson,[1]	Dorchester,	7 Nutting Avenue.
Ferris, Adaline Lawson,	Ridgefield Park, N. J.,	Draper Hall.
Flagg, Wayne McGrillis,	Mittineague,	116 Pleasant Street.
Flint, Oliver Simeon,	Lowell,	120 Pleasant Street.
Ford, Thomas Henry,[1]	Medford,	26 High Street.
Francis, Donald Smith,[1]	Athol,	35 North Prospect Street.
Freeborn, Theodore Merton,[1]	Fall River,	Brooks Farm.
French, Donald Lee,	Sandwich,	36 North Prospect Street.
Gamage, Carl Everett,[1]	East Lynn,	75 Pleasant Street.
Gillette, Glenn Councilman,[1]	Montague,	21 Fearing Street.
Goldstein, Maurice,	Lynn,	41 Pleasant Street.

[1] Work incomplete.

Graham, Leland Jenkins,	North Amherst,	North Amherst.
Gray, Milton Berford,	Woods Hole,	77 Pleasant Street.
Grayson, Emory Ellsworth,	Milford,	19 Nutting Avenue.
Griswold, Leon Swift,	Wethersfield, Conn.,	116 Pleasant Street.
Groff, Howard Clarkson,	Amherst,	197 South Pleasant Street.
Gurshin, Carl Alfred,[1]	Lynn,	35 North Prospect Street.
Gustetter, Ray Henry,	Hartford, Conn.,	14 Nutting Avenue.
Haaren, Paul,	Brooklyn, N. Y.,	31 East Pleasant Street.
Haglestein, Charles Henry,[1]	Dorchester,	66 Pleasant Street.
Hallett, Charles Hiram,	Mansfield,	M. A. C. Farm House.
Harlow, Frank Edward,	Malden,	77 Pleasant Street.
Harlow, Paul Goodhue,	Malden,	77 Pleasant Street.
Harrington, Albert Timothy,[1]	Lynn,	Care of E. F. Gaskill.
Harris, Warren Timothy,[1]	Millbury,	Brooks Farm.
Hartford, Claude Ernest,	Townsend,	Brooks Farm.
Hauck, Roland Manss,	Cincinnati, O.,	14 Nutting Avenue.
Heffron, Paul John,	Sherborn,	Care of S. J. Wright.
Henderson, Elliott,	Hingham,	35 East Pleasant Street.
Higginbotham, Harry,[1]	Taunton,	120 Pleasant Street.
Higgins, Gardner William,[1]	Norfolk,	42 McClellan Street.
Hill, Edmund Baldwin,[1]	Rutherford, N. J.,	3 Nutting Avenue.
Holden, Richard Lynde,	Milford, N. H.,	82 Pleasant Street.
Holder, Ralph Clifton,	Millis,	42 McClellan Street.
Holt, Francis Stetham,[1]	Cambridge,	3 Nutting Avenue.
Hooper, Albert Averill,	Lynn,	75 Pleasant Street.
Hubbell, Franklin Homer,	Westport, Conn.,	30 Prospect Street.
Huckins, Warren Israel,[1]	Sharon,	60 Pleasant Street.
Illman, Margaret Keble,	West Pelham,	West Pelham.
Irving, William Raymond,	Taunton,	120 Pleasant Street.
Jackson, Richmond Merrill,[1]	Georgetown,	36 North Prospect Street.
Joslyn, Elwyn Duane,	Northfield, Vt.,	7 Nutting Avenue.
Kautzenbach, Georg Johannes,[1]	Somerville,	31 North Prospect Street.
Keegan, Thomas Michael,[1]	Worcester,	88 Pleasant Street.
Kelsey, Lincoln David,	West Hartford, Conn.,	12 Cottage Street.
Kinsman, Alfred Oberlin, Jr.,	Merrimac,	46 McClellan Street.
Lancey, Clifford Scales,	Townsend,	79 Pleasant Street.
Landers, Giles Ezra,	Cataumet,	81 Pleasant Street.
Larson, Frederick Christian,	Everett,	26 High Street.
Latham, Paul Walker,	Norwich Town, Conn.,	66 Pleasant Street.
Lawrence, Milford Robinson,	Falmouth,	83 Pleasant Street.
Leigh, James Alfred,[1]	Worcester,	3 Nutting Avenue.
Little, Louis,	Leominster,	– –
Livermore, William Tingley,	Lawrence,	77 Pleasant Street.
Loring, Albert,	Hull,	53 Lincoln Avenue.
Lydiard, Harry Crowther,	Hartford, Conn.,	3 Nutting Avenue.
Mack, Walter Adams,	Springfield,	15 Phillips Street.
MacLeod, Daniel Johnson,[1]	Wakefield,	Brooks Farm.
MacNaught, Warren Henry,	Plymouth,	Corner of Hallock and North Prospect streets.
Mars, Malcolm Rowe,	Walpole,	56 Pleasant Street.
Martel, John Edward,	Turners Falls,	29 McClellan Street.
Mather, Fred,	Taunton,	Brooks Farm.
Maurer, Erwin Emil,	Yonkers, N. Y.,	12 Cottage Street.
Mayo, Frank Willard,	Houlton, Me.,	120 Pleasant Street.
Mayo, William Irving, Jr.,	Framingham Center,	M. A. C. Farm House.
McGuire, Raymond Thomas,[1]	Worcester,	17 Fearing Street.
McRae, Herbert Rankin,	Malden,	13 Fearing Street.
Merrill, Dana Otis,[1]	Pepperell,	6 Phillips Street.
Moorhouse, Newell,	Worcester,	17 Fearing Street.
Nash, Herman Beaman,	North Hadley,	Amherst.
Nason, Leonard Hastings,[1]	Auburndale,	Brooks Farm.
Nath, Morris,[1]	Dorchester,	41 Pleasant Street.

[1] Work incomplete.

Nelson, John Brockway,[1]	Newburyport,	Brooks Farm.
Nestle, William John,	Amherst,	32 Whitney Street.
Nims, Homer Willis,[1]	Montague,	21 Fearing Street.
Noyes, John Walker,[1]	Chelsea,	35 North Prospect Street.
Oertel, August Leonard,	South Hadley Falls,	Amherst.
Oliver, George Taylor, Jr.,[1]	Everett,	84 Pleasant Street.
Pareis, Egbert Leigh,	Elizabeth, N. J.,	66 Pleasant Street.
Patton, Willard Ginn,[1]	South Framingham,	M. A. C. Farm House.
Petit, Arthur Victor,[1]	Amherst,	31 East Pleasant Street.
Picard, Louis Francis,[1]	Hadley,	Hadley.
Pickard, Walter Douglas,	Hopedale,	77 Pleasant Street.
Pierce, Harold Barnard,	Kansas City, Mo.,	Corner Fearing and Pleasant streets.
Pike, Chester Arthur,[1]	Smith's,	24 Beston Street.
Poland, Robert Rantoul,[1]	West Acton,	24 Beston Street.
Porter, Wayland Robinson,	Amherst,	Amherst.
Pratt. Harold Arthur,	Shrewsbury,	Care of Professor Morton.
Purtle, William Edward,[1]	Monticello, Ky.,	6 Allen Street.
Pyne, Roger Sorenson,[1]	Springfield,	15 Phillips Street.
Quimby, Charles Frederick,	Cape Neddick, Me.,	35 East Pleasant Street.
Randall, Earle MacNeill,	Somerville,	44 Pleasant Street.
Ratner, Charles Cosrael,[1]	Springfield,	58 Pleasant Street.
Ritter, Ernest,	New Britain, Conn.,	120 Pleasant Street.
Rodger, Raymond Miller,	Everett,	9 Fearing Street.
Rorstrom, Hans Alfred,[1]	Boston,	Brooks Farm.
Rosequist, Birger Reignold,[1]	Brockton,	18 Nutting Avenue.
Ross, Louis Warren,	Arlington,	79 Pleasant Street.
Ruppell, Arthur Daniel,[1]	Lynn,	Care of E. F. Gaskill.
Rutter, Walter Frederick,[1]	Lawrence,	15 Fearing Street.
Saidel, Harry Samuel,	Worcester,	3 Nutting Avenue.
Sargent, George Leonard,	Merrimac,	46 McClellan Street.
Saville, William, Jr.,	Waban,	40 Amity Street.
Schaefer, Leonard Charles,[1]	Somerville,	36 North Prospect Street.
Schur, Arthur Leon,	Boston,	7 Nutting Avenue.
Schwab, Andrew Nathan,[1]	Yalesville, Conn.,	81 Pleasant Street.
Scott, George Alvin,[1]	Clinton,	36 North Prospect Street.
Seavey, Marden Homer,[1]	Westford,	Brooks Farm.
Sevrens, Linton Garfield,[1]	Medway,	- -
Shumway, Paul Edward,[1]	Greenfield,	60 Pleasant Street.
Simons, Clifton Harbough,[1]	Newton Center,	3 McClellan Street.
Sims, James Stanley,	Melrose,	13 Phillips Street.
Smith, Herbert Dwight,[1]	Poughkeepsie, N. Y.,	Care of S. J. Wright.
Smith, Hayden Henkel,	Springfield,	15 Phillips Street.
Smith, Richard Woodworth,	Pittsfield,	84 Pleasant Street.
Spaulding, Almon Whitney,	Dorchester,	18 Nutting Avenue.
Squires, Paul Revere,[1]	Belchertown,	Belchertown.
Stackpole, Frank Charles,[1]	Somerville,	18 Nutting Avenue.
Stearns, Carlton McIntyre,[1]	Melrose,	13 Phillips Street.
Stempler, Morris,[1]	Boston,	41 East Pleasant Street.
Stiles, Albert Ralph,	Arlington Heights,	36 North Prospect Street.
Stjernlof, Axel Uno,	Worcester,	Brooks Farm.
Stowell, Harold Thurber,[1]	Amherst,	193 South Pleasant Street.
Strong, William Andrew,	New York, N. Y.,	10 South College.
Sturtevant, Warren Butterfield,	Springfield,	83 North Pleasant Street.
Swett, Francis Stuart,	Southbridge,	116 Pleasant Street.
Swift, Raymond Walker,	North Amherst,	North Amherst.
Terrill, Herbert William,	Ansonia, Conn.,	North Pleasant Street.
Tucker, Arthur Currie, Jr.,[1]	Nyack, N. Y.,	81 Pleasant Street.
Tucker, Lee Heston,	Ware,	120 Pleasant Street.
Turner, Willis,	North Reading,	35 North Prospect Street.
Tuthill, Samuel Fuller,	Mattapoisett,	31 East Pleasant Street.
Upson, Everett Langdon,[1]	New Britain, Conn.,	Care of Professor Sears.

[1] Work incomplete.

Walbridge, Henry Blood,	Bennington, Vt.,	32 North Prospect Street.
Warner, Merrill Pomeroy,	Sunderland,	5 Nutting Avenue.
Warren, Harold Manson,	Melrose,	5 McClellan Street.
Warren, James Joseph,	North Brookfield,	35 North Prospect Street.
Westman, Robert Clayton,[1]	Roslindale,	Brooks Farm.
Wheeler, Chester Warren,	Southborough,	88 Pleasant Street.
Whitcomb, Warren Draper,[1]	Waltham,	120 Pleasant Street.
White, J. Edward Walbridge,[1]	North Bennington, Vt.,	32 North Prospect Street.
Whitney, Joseph Fradley,	Brooklyn, N. Y.,	52 Lincoln Avenue.
Wilber, Charles Raymond,	Walpole,	56 Pleasant Street.
Williams, Arthur Franklin,	Sunderland,	5 Nutting Avenue.
Williams, Herbert Clifton,	South Hadley Falls,	Care of Dr. Clark.

Unclassified Students.

Burekes, Harold James,	Waltham,	15 Phillips Street.
Comeau, Mark Walter,	Maynard,	75 Pleasant Street.
Dodd, Dexter Tiffany,	Chestnut Hill,	83 Pleasant Street.
Fellows, Katharine Adelheid,	Northampton,	38 Paradise Road, Northampton.
Fiske, Howard Benjamin,	Passaic, N. J.,	Care of C. W. Marshall.
Hamlin, Margaret Ruth Pomeroy,	Easthampton,	3 Fearing Street.
Healy, James John,	Florence,	35 North Prospect Street.
Hunnewell, Paul Fiske,	West Somerville,	13 Phillips Street.
Kelsey, Edmund Dean,	Cambridge,	79 Pleasant Street.
Kerr, Tracy,	Springfield,	Brooks Farm.
Lindsley, Horace Nelson,	Orange, N. J.,	83 Pleasant Street.
MooradKanian, Gregory,	Lawrence,	Hillside Avenue.
Morton, Leander Paul,	Amherst,	Care of Professor Morton.
Newton, Raymond Lovejoy,	Malden,	3 Nutting Avenue.
Putney, Roy Luther,	East Lynn,	Care of E. F. Gaskill.
Rossell, Irving Rowland,	Rahway, N. J.,	29 McClellan Street.
Stranahan, Mrs. Grace E.,	Montelair, N. J.,	Northampton.
Studley, Robert Allan,	Newton Highlands, Rockland.	44 Triangle Street.
Swofford, Lindsey,	Mt. Mitchell, N. C.,	— —
Talbot, Marjorie,	Roxbury,	Draper Hall.
Upham, Harland Willis,	Thornton's Ferry, N. H.,	8 Allen Street.
Watson, LeRoy Prouty,	Spencer,	66 Pleasant Street.
Willard, Harold Nelson,	Baltimore, Md.,	Care of Mr. Julian.
Winter, Henry George,	Ashburnham,	Care of E. F. Gaskill.

Summary by Classes.

Graduate students,	40
Senior class,	98
Junior class,	103
Sophomore class,	140
Freshman class,	202
Unclassified students,	24
Total registration,	607

Geographical Summary.

Massachusetts,	499
New York,	28
Connecticut,	24
New Jersey,	11
Vermont,	7
New Hampshire,	6
Pennsylvania,	6

[1] Work incomplete.

Rhode Island,	3
Ohio,	3
Maine,	3
Wisconsin,	2
Alabama,	1
Barbados,	1
Canada,	1
Colombia, S. A.,	1
Illinois,	1
Japan,	1
Kentucky,	1
Maryland,	1
Michigan,	1
Missouri,	1
Nebraska,	1
North Carolina,	1
Porto Rico,	1
Turkey,	1
Virginia,	1
Total,	607

Short Courses — 1913.

Winter School — 1913.

Abbot, Francis A.,	Harvard.
Abbot, Mary Perkins,	Harvard.
Allen, John S.,	Roxbury Crossing, 24 Edge Hill Street.
Angier, Henry,	Amherst.
Babbitt, Howard S.,	Chicopee, 340 Grove Street.
Bacon, Ralph D.,	Worcester, 401 Chandler Street.
Barker, Bowen,	Groton.
Barnes, Joseph C.,	Lanesborough.
Bartlett, C. S.,	Lowell, Hood Farm.
Barton, Charles E.,	Wilmington.
Bartow, Lathrop,	New York City, 33 West 73d Street.
Beals, Harry W.,	Plainfield.
Bean, Arthur H.,	Florence, 173 Spring Street.
Bickford, A. O.,	Hubbardston.
Bittinger, Fritz John,	Plymouth.
Borden, Aubrey W.,[1]	South Framingham.
Bridgman, Federal B.,	Northampton.
Bridgman, Gertrude L.,[1]	South Amherst.
Budd, Roger,	Holyoke, 7 Nonotuck Street.
Butterfield, L.,	Lexington.
Cady, C. M.,	Amherst.
Candage, Uzial F.,	Norfolk, Avery Street.
Cannon, T. Vincent,[1]	– –
Carleton, Boyd,	Boston, 170 Summer Street.
Cathie, Harold Gordon,	Needham, Pleasant Street.
Chambers, Maude B.,	Amherst, 8 Allen Street.
Chase, Newell D.,	Walbrook, Md.
Clapp, Roger W.,	Westhampton.
Clark, Leonard T.,	Wethersfield, Conn.
Coffin, Robert L.,	Amherst.
Cotter, William F.,	Salem, 25 Aborn Street.
Creesuy, Richard Lincoln,	Brookline, 48 Harris Street.
Crosby, Stanley W.,	Warren.
Darling, Ada Braun,	Greenfield.
Davis, Patrick,	Chestnut Hill, 40 Orchard Road.
Davis, Walter H.,	Amherst, R. F. D.
Day, Albert L.,	Graniteville.
Day, Don L.,	Cyrus.
Day, D. Percy,	West Kennebunk, Me.
Day, George Clarence,[1]	West Kennebunk, Me.
Dayton, Fred A.,	Springfield, 207 Bay Street.
Delano, Kenneth H.,	Boston.
Dickinson, Richard L.,	Sunderland.
Dole, Fred B.,	Shelburne.
Doran, Ralph C.,[1]	North Dartmouth.
Drake, Gilbert H.,	North Bellingham.
Dunbar, Guy C.,	Chestnut Hill, South Street.
Estabrook, O. B.,	Hopedale.
Evans, John M.,	Northampton, 21 Summer Street.
Fenn, Fred S.,[1]	Westminster, Vt.
Fiebiger, P.,	Granby.

[1] Withdrawn. Fee refunded on account of scarlet-fever epidemic.

Fisher, Mrs. Ellen N.,	Boston, 1359 Commonwealth Avenue.
Flint, Orville J.,	Westhampton.
Foley, Fred F.,	Fitchburg.
Francis, Benjamin A.,	Rock.
Fuller, Leroy D.,	Granby.
Goodrich, Mary E.,	Needham.
Greenwood, Laurence J.,	Billerica, Dudley Street.
Guild, Sydney T.,	Medford, 31 College Avenue.
Gummow, Earl R.,	Halifax.
Hannigan, William E.,	West Fitchburg, 171 Depot Street.
Harris, Myron A.,	Farmington.
Hepburn, Philip S.,	Sunderland.
Higgins, Edward L.,	North Billerica.
Hobart, Clarence A.,[1]	North Amherst.
Howells, Daniel W.,	179 Summit Avenue, Upper Montclair, N. J.
Ingalls, O. D.,	99 South Fullerton Street, Montclair, N. J.
Jackson, Charles A.,	Unadilla, N. Y.
Jenks, E. Lawrence,	Kensington, Conn.
Keefe, Mrs. Daniel F.,	Ipswich.
Keyes, F. Grant,	Bryantville.
Kilbourn, Walter G.,[1]	South Lancaster.
Kohl, Philip William,	Franklin, Lincoln Street.
Kress, Paul E.,	Hingham Center, Box 33.
Leavitt, Arthur W.,	Roslindale.
Lent, Paul H.,	Worcester.
Lerner, Rose S.,	Millis.
Lincoln, Jerome W.,	Taunton.
Lyman, C. E.,[1]	South Hadley.
Lyman, Frederick C.,	Amherst.
McGarry, Virginia,	Grafton, South Street.
McIntosh, Allan,	Needham, Great Plain Avenue.
Mason, Carrie L.,	Winchester, 31 Vine Street.
Meurisse, John,	Monson, R. F. D. No. 2.
Miller, Arthur L.,	Westborough.
Millett, Leon E.,	Whitman, Station A.
Moller, Martin T.,	Bridgeport, Conn.
Moore, A. S.,	Northampton.
Morton, Leander P.,	Amherst.
Moynahan, Felix,	Chicopee.
Murtaugh, Joseph P.,	Auburndale.
Nixon, William J.,	Roxbury, 36 Woodcliff Street.
Noonan, D. A.,	South Boston.
Nyce, Jonas W.,[1]	Sonderton, Pa., 114 Chestnut Street.
O'Rourke, John,	New Bedford.
Otis, W. H.,	Fitchburg.
Paley, Israel,	Colchester, Conn.
Paulson, Joseph W.,	Milton.
Pease, Harold M.,	Chester, R. F. D., No. 2.
Perley, Raymond,	Georgetown.
Perry, Roger Newton,	Worcester, 82 Park Avenue.
Pierce, Fred W.,	Wrentham, East Street.
Poor, Ben Perley,	North Andover, 341 Sutton Street.
Porter, William D.,	Holliston, R. F. D., No. 10.
Pratt, Anson M.,	Pownal, Vt.
Priest, Harold A.,	Gleasondale.
Prout, Norman W.,	Grafton.
Quinn, Joseph A.,	Amherst.
Rich, Alton F.,	Winthrop.
Robinson, H. V.,	Medford, 69 Summer Street.
Robsham, Rolf V.,	Northampton, 490 Elm Street.

[1] Withdrawn. Fee refunded on account of scarlet-fever epidemic.

Roe, Harold B.,	East Windsor, Conn.
Rothwell, Mrs. Bernard J.,	Needham.
Ross, Evan A.,	Northampton, 490 Elm Street.
St. Amand, Joseph F.,	Salem.
Scholz, Paul A.,	Adams.
Schwarz, Miss Julia,	Sharon.
Shannon, Arthur L.,	Millis, Exchange Street.
Sharkey, John E.,	Sunderland.
Sherwood, Grover,	Chester, R. F. D. No. 2.
Shipman, Raymond D.,[1]	South Hadley, R. F. D.
Simes, Louis,	Boston, 5 Tileston Street.
Smith, Harold,	Avon, Box 202.
Smith, Harry,	Revere, 99 Bellingham Avenue.
Smith, Linn A.,	Unadilla, N. Y.
Smith, L. Edmund,	West Brookfield.
Spencer, J. Arthur,	Milton.
Steacie, Edward, Jr.,	Dorchester, 37 Bloomfield Street.
Talmage, Frank M.,	Great Barrington.
Taylor, Frank R.,	Frye, Me.
Taylor, Dr. Frederick Leon,	Natick, Forest Avenue.
Thompson, Charles Bush,	Dover.
Thompson, Ralph M.,	Winchester.
Tomlinson, Bertram,	Northampton, 25 James Avenue.
Tracy, Alfred E.,[1]	South Boston, 504 Sixth Street.
Truesdell, Clarence E.,	Zoar.
Turner, Ralph C.,	Upham's Corner, 54 Grampian Way.
Twombly, Harry,	New London, N. H.
Vincent, T. Lawrence,	Torrington, Conn., R. F. D.
Waid, B. F.,	Amherst, 61 Amity Street.
Warner, J. H.,	Sunderland.
Wetherbee, Dwight E.,	Amherst.
White, Alfred Baylies,	Taunton, 120 High Street.
Whiting, Charles Theodore,	Greenfield.
Whitlock, Aaron A.,	Warehouse Point, Conn.
Whittaker, Clifford F.,	Taunton.
Wilbur, Woodward Arthur,	Lanesborough, Lincoln Street.
Wildes, Theo. B.,	Boston, 31 Marlborough Street.
Williams, Alexander,	Boston, Hotel Charlesgate.
Willett, George B.,	Dracut.
Wolschendorf, George E.,	Whitman.
Woodman, Rodney Canfield,	Milford, 12 Amherst Street.
Young, Harold B.,	Yalesville, Conn.
Zappey, J. Frederick,	West Wrentham.

Students in Apple-packing School, Jan. 23-29, 1913.

Barker, Bowen,	Groton.
Brooks, George A.,	Boston, 18 Derne Street.
Bruner, Myron L.,	Wilbraham.
Byrne, Edward J.,	Ardmore.
Capen, Samuel H.,	Dedham.
Davis, W. M.,	Boston, 93 Beach Street.
Emerson, W. K.,	Concord Junction.
Foster, H. K.,	Ashby.
Guild, S. T.,	Medford, 31 College Avenue.
Hall, Russell B.,	Amherst.
Jenks, L. P.,	Williamstown.
Laboutely, G. E.,	Belchertown.
Lerner, Rose,	Peru.
Mason, O. N.,	Wrentham.
Moran, T. H.,	Jericho, Vt.
Nyce, Jonas W.,	Sonderton, Pa., 114 Chestnut Street.

[1] Withdrawn. Fee refunded on account of scarlet-fever epidemic.

Parsons, Wilfred A.,	Southampton,
Paul, Eleanor Frances,	Sherborn.
Reid, John,	Woronoco.
Sampson, S. D.,	M. A. C., 1913.
Searle, Edward C.,	Southampton,
Snyder, Henry H.,	Cummington.
Watson, Ralph C.,	South Freeport, Me.
Wood, Burt F.,	Athol.
Wooding, E. M.,	Clintonville, Conn.

School for Tree Wardens, 1913.

Abbe, F. H.,	Boston.
Bailey, L. S.,	Middleborough.
Bailey, Mrs. L. S.,	Middleborough.
Ball, L. P.,	Winchendon.
Bean, Minot A.,	Chelmsford.
Bemis, E. L.,	Brookfield.
Bragg, J. W.,	Greenfield.
Bray, Thomas A.,	Holyoke, 19 Laurel Street.
Breed, Edward W.,	Clinton.
Brown, Percival S.,	Scituate.
Burns, Wm. G.,	Greenfield.
Callahan, James F.,	Peabody.
Campbell, Wm. A.,	Greenfield.
Carrick, Thomas F.,	Dracut, R. F. D.
Cutter, H. A.,	Bedford.
Davis, J. Alden,	Springfield.
Dodge, A. W., Jr.,	Reading.
Eastman, Geo. F.,	Granby.
Field, A. F.,	Hillsborough.
Gay, E. F.,	Norwood.
Gaylord, R. S.,	Hadley.
Guptill, Melvin,	Boston, 49 North Washington Street.
Haskell, T. P.,	Northborough.
McLaughlin, J. H.,	Millers Falls.
Mills, D. C.,	Fitchburg.
Moore, C. A.,	Westfield.
Neale, Harold J.,	Worcester.
O'Brien, Wm. H.,	North Billerica.
Pierpont, John E.,	Williamsburg.
Peeso, J. A.,	Belchertown.
Phillips, Albert A.,	Greenfield.
Rane, F. W.,	Boston.
Reynolds, Harriet,	Boston, 4 Joy Street.
Ruch, C. N.,	Granby.
Sautelle, B. A.,	Greenwich.
Shaw, Frank H.,	Rockland.
Southard, F. D.,	Milton.
Symmes, Samuel S.,	Winchester.
Wilkins, Geo. S.,	Carlisle.
Whitaker, C. L.,	New York City, 470 4th Avenue.
Whitney, Geo. A.,	Athol.
Woothly, L. H.,	Boston.
Zeissig, S. E.,	Ware.

Bee Course, 1913.

Baker, H. Raymond,	Amherst.
Dickens, Gustav,	Cheshire, Conn.
Haynes, Edgar G.,	Suffield, Conn.
Lord, Carey Stevens,	Richmond.
Loverin, Harriet,	Shelton, Conn.
Robinson, Lucy M.,	Waltham.

STUDENTS OF THE SUMMER SCHOOL, 1913.

Adams, Mabelle,	97 Paradise Road,	Swampscott.
Alden, Marie P.,	365 Hancock Street,	Brooklyn, N. Y.
Allen, H. C.,	– –	Phoenix, Ariz.
Anderson, Sheed,	497 Warren Street,	Roxbury.
Bachelder, Grace,	9 St. James Avenue,	Boston.
Banning, Laura,	242 South 4th Avenue,	Mt. Vernon, N. Y.
Bantle, Ida E.,	– –	Amherst.
Barker, Luliona,	– –	Amherst.
Batchelder, Isabel,	Hillside Street,	Amesbury.
Bill, Mrs. Mary E.,	58 Prospect Street,	Waltham.
Blackmer, Nellie E.,	106 Euclid Avenue,	Springfield.
Bousfield, Mary,	1 Whiteley Street,	North Adams.
Briggs, Rose,	R. F. D.,	Bournedale.
Britton, Harriet W.,	47 Farmington Avenue,	Hartford, Conn.
Brockway, Clarence A.,	31 Hancock Street,	West Springfield.
Brooks, Laura J.,	31 Stevens Street,	Stoneham.
Brooks, Loura L.,	62 Chestnut Street,	Gardner.
Brown, H. Whittemore,	Elm Street,	Concord.
Brown, Marion S.,	946 Central Avenue,	Plainfield, N. J.
Brown, Percy M.,	946 Central Avenue,	Plainfield, N. J.
Brown, Susie,	– –	Amherst.
Brownell, Harriet M.,	– –	Bryn Mawr, Pa.
Bryant, Bertha W.,	Rest Hill,	Woburn.
Burnap, Margaret,	Rest Hill,	Woburn.
Capen, Arthur C.,	– –	Worthington.
Chamberlin, Mrs. Edwin,	2 Avon Street,	Cambridge.
Chamberlin, Edwin,	2 Avon Street,	Cambridge.
Clapp, Harriet A.,	9 Rockledge Place,	Yonkers, N. Y.
Clark, Mrs. R. F.,	42 West 35th Street,	New York, N. Y.
Clark, Ruth,	10 Hallock Street,	Amherst.
Clark, Katherine,	– –	North Amherst.
Cornell, Edward B.,	– –	Haverhill, N. H.
Crew, Caroline L.,	903 Tatnall Street,	Wilmington, Del.
Darrow, W. H.,	16 Bennock Street,	Orono, Me.
Davis, Irving L.,	– –	Brimfield.
Davis, Emma A.,	60 High Street,	Medford.
Dean, Lucy,	416 Marlborough Street,	Boston.
Douglas, Nan,	South Main Street,	Great Barrington.
Dowe, Amy H.,	50 Summer Street,	Norwich, Conn.
Drake, Mary A.,	53 Institute Road,	Worcester.
Eastman, Dora W.,	United States Indian School,	Genoa, Neb.
Eastwood, Wm.,	507 Beacon Street,	Boston.
Emerson, Marguerite,	395 Broadway,	Cambridge.
Felton, F. Ethel,	9 Phillips Street,	Amherst.
Fimiss, Mrs. M. A.,	57 High Street,	Medford.
Flagg, Sadie E.,	– –	West Berlin.
Frost, Mildred N.,	106 Pleasant Street,	Newton Center.
Glazier, Leta M.,	– –	Amherst.
Goodnow, Edna M.,	– –	Amherst.
Hall, Florence J.,	– –	Waltham.
Hall, Ida E.,	– –	Waltham.
Harris, Jessie F.,	9 Silver Street,	Worcester.
Hunck, Walter L.,	3114 West 8th Street,	Cincinnati, O.
Hunck, Roland M.,	3114 West 8th Street,	Cincinnati, O.
Hayward, Marguerite,	8 Dana Street,	Cambridge.
Hewins, Alfred S.,	Maple Place,	Dedham.
Holden, Clara B.,	19 Avon Street,	Melrose.
Hooker, Bessie M.,	5 North East Street,	Amherst.
Howard, Clara,	– –	North Amherst.
Howe, Florence I.,	28 Myrtle Street,	Leominster.
Howlett, Cora M.,	– –	South Amherst.

Hoyt, Laura A.,	68 Federal Street,	Greenfield.
Hurlin, Edna M.,	77 Mayfield Street,	Boston.
James, J. E.,	446 Marlborough Street,	Boston.
Janvier, Margaret R.,	–	Lansdowne, Pa.
Johnson, Roscoe E.,	14 Roberts Hall,	Waterville, Me.
Kellogg, Ella,	–	North Amherst.
Kennedy, Anna,	30 Park Avenue,	South Weymouth.
Kezar, Myrtle E.,	–	Belchertown.
Knowles, Grace,	1 Roxbury Avenue,	Natick.
Lane, Madeline H.,	–	Great Barrington.
Lawrence, N. Louise,	425 Marlborough Street,	Boston.
McBurney, Henry,	35 Lincoln Avenue,	Amherst.
MacDonald, Ruby,	456 Centre Street,	Jamaica Plain.
Marble, Mrs. W. Cary,	1970 Morgan Avenue,	Hollywood, Cal.
Marsh, Ida M.,	The Capitol,	Albany, N. Y.
Maynard, Pearl A.,	447 Crafts Street,	West Newton.
Mead, S. Gordon,	Lake Waranaug,	New Preston, Conn.
Milligan, Lester O.,	Box 186,	Dalton.
Mills, Mabelle L.,	–	Amherst.
Nestle, Grace,	–	Amherst.
O'Hern, Elizabeth V.,	85 Furnace Street,	North Adams.
Parsons, Elsie J.,	11 School Street,	Adams.
Pease, Willard,	Pleasant Street,	Amherst.
Perry, Gerald,	17 Amity Street,	Amherst.
Pettis, Sybil,	–	Thompson, Conn.
Phillips, Arthur W.,	10 Prospect Hill,	Somerville.
Phillips, Ralph O.,	10 Prospect Hill,	Somerville.
Platt, Mrs. Royal T.,	Laconic Avenue,	Great Barrington.
Porter, Grace,	Perkins Institute,	Watertown.
Pulsifer, Woodbury,	–	Washington, D. C.
Putnam, Charles S.,	Care of A. E. Sargent, R.F.D.	Groton.
Raker, Helen S.,	39 Magazine Street,	Cambridge.
Reidy, Lillian C.,	169 East 90th Street,	New York, N. Y.
Richards, Clinton J.,	22 Prospect Avenue,	Northampton.
Robinson, Dr. Mary B.,	30 Harris Street,	Waltham.
Rowell, Alice M.,	–	Tilton, N. H.
Sanborn, Arthur,	183 Central Street,	Winter Hill.
Scheuele, J. A.,	Hampt. County Imp.,	Springfield.
Seaver, Myrtle B.,	–	Williamstown.
Severance, Caroline,	–	Amherst.
Shumway, Ruth,	–	Amherst.
Small, Lucy B.,	–	North Truro.
Smith, Abbie M.,	–	Salisbury.
Spaulding, Lyford P.,	23 Waltham Street,	Lexington.
Spear, Harriet,	–	North Amherst.
Stebbins, Dorothea,	405 Marlborough Street,	Boston.
Steinhauer, E. K.,	–	Rome, N. Y.
Stewart, Isabel A.,	161 West 14th Street,	New York City.
Thorpe, Willis E.,	8 Ash Street,	Danvers.
Thurston, Grace R.,	111 Gainsboro Street,	Boston.
Thyng, Mary E.,	19 Cherry Street,	Lynn.
Upham, Harlan W.,	–	Thornton's Ferry, N. H.
Vietz, Paul W.,	–	West Acton.
Walker, Geo. J.,	–	Lexington.
Webb, D. Frances,	9 Phillips Street,	Amherst.
Weeks, Gertrude,	25 Peterborough Street,	Boston.
Welch, Anna G.,	32 Fenwick Street,	Somerville.
Whitcomb, Ralph,	–	Amherst.
White, Jr., Robert,	1039 Massachusetts Avenue,	Cambridge.
Wight, Mrs. Charles L.,	–	Honolulu, Hawaii.
Winslow, Alice V.,	Normal Hall,	Framingham.
Winslow, Isabelle F.,	257 Steuben Street,	Brooklyn, N. Y.
York, Mrs. Olla A.,	2 Fearing Street,	Amherst.

Greene, Mrs. Anna A.,	–	–	Cotuit.
Morton, Charlotte,	–	–	Amherst.
Nickerson, Mrs. C. E.,	–	–	Amherst.

School for Rural Social Workers, 1913.

Guptill, Roger S.,	–	–	Kingston, N. H.
Jobbins, Rev. E. W.,	Granby Road,		Southwick.
Kebbe, David L.,	–	–	Cummington.
Klinck, L. S.,	MacDonald College,		Quebec, Can.
Panunzio, C. M.,	Box 547,		Amherst.
Patt, Hermann G.,	–	–	Granville.

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THE M. A. C. BULLETIN

AMHERST, MASS.

Vol. VII. No. 1. For January, 1915

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CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE, 1914-1915.

Fifty-second Annual Report.

Part II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1915.

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1914-1915.



BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1915.

A.A.W.

Approved by
The State Board of Publication.

The Massachusetts Agricultural College.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow. Additional announcements are made in a supplementary bulletin, published in the spring.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue. Special publication will be made should it become necessary on account of important changes.

CALENDAR.

1915-16.

REGULAR COURSES.

1915.

January 4, Monday, 1 P.M.,	Winter recess ends; regular schedule of classes.
January 22, Friday, 8 A.M.,	Semester examinations begin.
February 1, Monday, 1 P.M.,	Second semester begins; regular schedule of classes.
February 22, Monday forenoon,	Half holiday, Washington's Birthday.
March 26, Friday, 5 P.M.,	Spring recess begins.
April 5, Monday, 1 P.M.,	Spring recess ends; regular schedule of classes.
April 19, Monday forenoon,	Half holiday, Patriots' Day.
May 31, Monday,	Holiday, observance of Memorial Day.
June 1, Tuesday, 8 A.M.,	Senior and junior examinations begin.
June 5, Saturday, 8 A.M.,	Sophomore and freshman examinations begin.
June 12–16, Saturday–Wednesday,	Commencement.
June 17–19, Thursday–Saturday,	Entrance examinations.
September 8–11, Wednesday–Saturday,	Entrance examinations.
September 15, Wednesday, 1.30 P.M.,	First semester begins; chapel.
October 12, Tuesday forenoon,	Half holiday, Columbus Day.
November 24, Wednesday, 12 M.,	Thanksgiving recess begins.
November 29, Monday, 1 P.M.,	Thanksgiving recess ends; regular schedule of classes.
December 17, Friday, 5 P.M.,	Winter recess begins.

1916.

January 3, Monday, 1 P.M.,	Winter recess ends; regular schedule of classes.
January 28, Friday, 8 A.M.,	Semester examinations begin.
February 7, Monday, 1 P.M.,	Second semester begins; regular schedule of classes.
February 22, Tuesday forenoon,	Half holiday, Washington's Birthday.
March 24, Friday, 5 P.M.,	Spring recess begins.
April 3, Monday, 1 P.M.,	Spring recess ends; regular schedule of classes.
April 19, Wednesday forenoon,	Half holiday, Patriots' Day.
May 30, Tuesday,	Holiday, Memorial Day.
June 5, Monday, 8 A.M.,	Senior and junior examinations begin.
June 10, Saturday, 8 A.M.,	Sophomore and freshman examinations begin.
June 17–21, Saturday–Wednesday,	Commencement.
June 22–24, Thursday–Saturday,	Entrance examinations.

Massachusetts Agricultural College.

History. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of nearly all the buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the federal station, and subsequently the whole was incorporated with the college.

Courses. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-years[1] course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science, doctor of philosophy and master of agriculture. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and summer school. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, educational exhibits, lecture courses, demonstrations, and circulating libraries.

Purpose of the College. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural col-

[1] Twenty-seven teaching departments offer instruction in agriculture, horticulture, sciences, the humanities and rural social science. A system of major courses permits a student to elect major work in 1 of 15 departments, specializing in that and allied subjects for a period of two years.

leges and high schools, for scientific experts in chemistry, entomology, botany and microbiology and for business operations having connection with practical agriculture.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, botany and zoölogy, are an essential preparation. Still other students find the course a desirable education, without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which a major course is offered.

Location and Equipment. — The agricultural college is located in the town of Amherst. The grounds comprise more than 600 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

The Massachusetts Agricultural Experiment Station.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was then without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college, and was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about one-third of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to a committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, experimentation and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

THE CORPORATION.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
NATHANIEL I. BOWDITCH of Framingham,	1915
WILLIAM WHEELER of Concord,	1915
ARTHUR G. POLLARD of Lowell,	1916
CHARLES A. GLEASON of New Braintree,	1916
FRANK GERRETT of Greenfield,	1917
HAROLD L. FROST of Arlington,	1917
CHARLES H. PRESTON of Danvers,	1918
FRANK A. HOSMER of Amherst,	1918
DAVIS R. DEWEY of Cambridge,	1919
GEORGE P. O'DONNELL of Northampton,	1919
WILLIAM H. BOWKER of Concord,	1920
GEORGE H. ELLIS of West Newton,	1920
ELMER D. HOWE of Marlborough,	1921
EDMUND MORTIMER of Grafton,	1921

MEMBERS EX OFFICIO.

His Excellency Governor DAVID I. WALSH, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
DAVID SNEDDEN, *State Commissioner of Education.*
WILFRID WHEELER, *Secretary of the State Board of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor DAVID I. WALSH of Boston, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
WILFRID WHEELER of Concord, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

STANDING COMMITTEES OF THE CORPORATION.[1]

Committee on Finance.

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
FRANK A. HOSMER.
EDMUND MORTIMER.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, *Chairman.*
WILLIAM H. BOWKER.
FRANK A. HOSMER.
DAVID SNEDDEN.
ELMER D. HOWE.
DAVIS R. DEWEY.
GEORGE P. O'DONNELL.

Committee on Farm.

NATHANIEL I. BOWDITCH, *Chairman.*
FRANK GERRETT.
CHARLES A. GLEASON.
GEORGE H. ELLIS.

[1] The president of the college is ex officio member and secretary of standing committees.

Committee on Horticulture.

HAROLD L. FROST, *Chairman.*
DAVIS R. DEWEY.
ELMER D. HOWE.
WILFRID WHEELER.

Committee on Experiment Department.[1]

CHARLES H. PRESTON, *Chairman.*
WILFRID WHEELER.
ARTHUR G. POLLARD.
HAROLD L. FROST.
EDMUND MORTIMER.

Committee on Buildings and Arrangement of Grounds.

WILLIAM H. BOWKER, *Chairman.*
WILLIAM WHEELER.
FRANK GERRETT.
CHARLES H. PRESTON.
GEORGE P. O'DONNELL.

Committee on Extension Service.

ELMER D. HOWE, *Chairman.*
GEORGE H. ELLIS.
HAROLD L. FROST.
FRANK GERRETT.
WILFRID WHEELER.
EDMUND MORTIMER.

Examining Committee of Overseers from the State Board of Agriculture.

JOHN BURSLEY of West Barnstable.
FRANK P. NEWKIRK of Easthampton.
WILLIAM E. PATRICK of Warren.
JOHN J. ERWIN of Wayland.
R. HENRY RACE of North Egremont.

[1] The director of the experiment station is a member of the committee on experiment department, without vote.

Officers of the Institution.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

THE FACULTY.

Kenyon L. Butterfield, A.M., LL.D., ... President's House.
President of the College and Head of Division of Rural Social Science.

George F. Mills,[1] A.M., ... 21 Main Street.
Dean Emeritus.

Charles H. Fernald, Ph.D., ... 3 Hallock Street.
Honorary Director of the Graduate School.

Edward M. Lewis, A.M., ... 19 Lincoln Avenue.
Dean of the College and Professor of Languages and Literature.

Fred C. Kenney, ... Mount Pleasant.
Treasurer of the College.

William P. Brooks, Ph.D., ... 6 Farview Way.
Director of the Experiment Station and Lecturer on Soil Fertility.

William D. Hurd, M.Agr., ... 46 Amity Street.
Director of the Extension Service and Supervisor of Short Courses.

Charles E. Marshall, Ph.D., ... Sunset Avenue.
Director of the Graduate School and Professor of Microbiology.

Frank A. Waugh, M.Sc., ... Campus.
Head of Division of Horticulture and Professor of Landscape Gardening.

James A. Foord, M.Sc.Agr., ... Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Administration.

Robert J. Sprague, Ph.D., ... Mount Pleasant.
Head of Division of the Humanities and Professor of Economics and Sociology.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Goessmann Professor of Chemistry.

Charles Wellington, Ph.D., ... 34 Amity Street.
Professor of Chemistry.

James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science.

George E. Stone,[2] Ph.D., ... Mount Pleasant.
Professor of Botany.

Philip B. Hasbrouck, B.Sc., ... 130 Pleasant Street.
Professor of Physics and Registrar of the College.

John E. Ostrander, A.M., C.E., ... 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Professor of Entomology, Chairman of Division of Science.

George C. Martin, C.E., Captain 18th U. S. Infantry, ... Amherst House.
Professor of Military Science and Tactics.

William R. Hart, A.M., L.B., ... 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears, M.Sc., ... Mount Pleasant.
Professor of Pomology.

[1] Dean Mills died Oct. 27, 1914.

[2] On leave of absence; Associate Professor Osmun acting as head of Department of Botany.

JOSEPH S. CHAMBERLAIN, Ph.D., ... Mount Pleasant.
Professor of Organic and Agricultural Chemistry.
WILLIAM P. B. LOCKWOOD, M.Sc., ... 7 East Pleasant Street.
Professor of Dairying.
JOHN C. GRAHAM, B.Sc.Agr., ... Lincoln Avenue.
Professor of Poultry Husbandry.
WILLIAM D. CLARK, A.B., M.F., ... 3 Mount Pleasant.
Professor of Forestry.
SIDNEY B. HASKELL, B.Sc., ... North Amherst.
Associate Professor of Agronomy.
A. VINCENT OSMUN, M.Sc., ... 5 Kendrick Place.
Associate Professor of Botany.
CLARENCE E. GORDON, Ph.D., ... 38 Lincoln Avenue.
Associate Professor of Zoölogy and Geology.
ROBERT W. NEAL, A.M., ... 8 Woodside Avenue.
Associate Professor of English.
ALEXANDER E. CANCE, Ph.D., ... 9 Fearing Street.
Associate Professor of Agricultural Economics and Supervisor of Agricultural Surveys.
——— – –
Associate Professor of Rural Sociology.
BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Associate Professor of Beekeeping.
JOHN A. McLEAN, A.B., B.Sc.Agr., ... Lincoln Block.
Associate Professor of Animal Husbandry.
G. CHESTER CRAMPTON, Ph.D., ... 86 Pleasant Street.
Associate Professor of Entomology.
CHARLES A. PETERS, Ph.D., ... South Sunset Avenue.
Associate Professor of Inorganic and Soil Chemistry.
GEORGE E. GAGE, Ph.D., ... 27 Sunset Avenue.
Associate Professor of Animal Pathology.
CURRY S. HICKS, B.Pd., ... 8 Allen Street.
Associate Professor of Physical Education and Hygiene.
ERNEST ANDERSON, Ph.D., ... 3 Phillips Street.
Associate Professor of General and Physical Chemistry.
F. H. HESSELINK VAN SUCHTELEN, Ph.D., ... 73 Pleasant Street.
Associate Professor of Microbiology.
ARNO H. NEHRLING, ... 24 Pleasant Street.
Associate Professor of Floriculture.
CHRISTIAN I. GUNNESS, B.Sc., ... 4 Chestnut Street.
Associate Professor of Rural Engineering.
EDGAR L. ASHLEY, A.M., ... 24 Pleasant Street.
Assistant Professor of German.
ALEXANDER A. MACKIMMIE, A.M., ... North Amherst.
Assistant Professor of French.
RALPH J. WATTS, B.Sc., ... 10 Nutting Avenue.
Secretary of the College.
CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.
C. ROBERT DUNCAN, B.Sc., C.E., ... 31 North Prospect Street.
Assistant Professor of Mathematics.
ARTHUR K. HARRISON, ... 8 Allen Street.
Assistant Professor of Landscape Gardening.
ELVIN L. QUAIFE, B.Sc.Agr., ... 4 Nutting Avenue.
Assistant Professor of Animal Husbandry.
WILLIAM L. MACHMER, A.M., M.E., ... 3 Kendrick Place.
Assistant Professor of Mathematics.
HENRY E. SMITH, A.M., ... 24 Pleasant Street.
Assistant Professor of English.
WALTER W. CHENOWETH, A.B., M.Sc., ... North Amherst.
Assistant Professor of Pomology.
ELMER E. McDONALD, B.Sc., ... 24 Pleasant Street.
Assistant Professor of Agronomy.
HAROLD E. ROBBINS, B.Sc., A.M., ... 12 Nutting Avenue.
Assistant Professor of Physics.

FRANK W. RANE, M.F., ... Boston.
Lecturer in Forestry.
HELENA T. GOESSMANN, M.Ph., ... 13 Main Street.
Instructor in English.
WILLIAM L. HARMOUNT, A.B., ... 86 Pleasant Street.
Instructor in French.
ARTHUR N. JULIAN, A.B., ... Farview Way.
Instructor in German.
FREDERICK A. McLAUGHLIN, B.Sc., ... Clark Hall.
Instructor in Botany.
SAMUEL COONS, ... 56 Pleasant Street.
Instructor in Dairying.
WALTER E. PRINCE, Ph.B., A.M., ... 25 Pleasant Street.
Instructor in English and Public Speaking.
ROBERT H. BOGUE, B.Sc., ... North Amherst.
Instructor in Chemistry.
—— ——[1] – –
Instructor in Market Gardening.
FRANK N. BLANCHARD, A.B., ... 31 North Prospect Street.
Instructor in Zoölogy and Geology.
LOYAL F. PAYNE, B.Sc., ... 5 School Street.
Instructor in Poultry Husbandry.
FRANK P. RAND, A.B., ... 24 Pleasant Street.
Instructor in English.
RAYMOND G. SMITH, B.Sc., ... Clark Hall.
Assistant in Botany.
WILLIAM J. FITZMAURICE, ... – –
Assistant in Physical Education.
HAROLD M. GORE, B.Sc., ... 8 Allen Street.
Assistant in Physical Education.
BURT A. HAZELTINE, B.Sc., ... 4 North Prospect Street.
Assistant in Mathematics.
HAROLD E. BALDINGER, B.Sc., ... 2 McClellan Street.
Assistant in Dairying.
WILLIAM S. REGAN, B.Sc., ... 6 Allen Street.
Assistant in Entomology.

GRADUATE ASSISTANTS.

ROY C. AVERY,[2] B.Sc., ... 17 Phillips Street.
Department of Microbiology.
CHARLES G. BAIRD, A.M., ... 31 North Prospect Street.
Department of Rural Sociology.
ERNEST L. DAVIES,[3] B.Sc., ... 75 Pleasant Street.
Department of Microbiology.
FRANKLIN C. GURLEY, B.Sc., ... 81 Pleasant Street.
Department of Chemistry.
ARAO ITANO, B.Sc., ... 73 Pleasant Street.
Department of Microbiology.
RUSSELL F. LUND, A.B., ... Pine Heights.
Department of Rural Sociology.
JAMES F. MARTIN, M.Sc., ... 19 South East Street.
Department of Entomology.
FREDERICK G. MERKLE, B.Sc., ... East Street.
Department of Agronomy.
STUART P. MILLER, B.Sc., ... 81 Pleasant Street.
Department of Chemistry.
CARL F. OBERHELMAN, B.Sc., ... 81 Pleasant Street.
Department of Landscape Gardening.
HAROLD A. ROBINSON, B.Sc., ... 6 Allen Street.
Department of Chemistry.

[1] Position filled temporarily by Mr. Harold F. Tompson.
[2] From Nov. 14, 1914.
[3] Resigned, to take effect Nov. 14, 1914.

PAUL SEREX, Jr., B.Sc., ... Chemical Laboratory.
Department of Chemistry.
CARL J. STRAND, A.M., ... 75 Pleasant Street.
Department of Agricultural Economics.
ARTHUR S. THURSTON, B.Sc., ... 92 Pleasant Street.
Department of Floriculture.
WARREN F. WHITTIER, A.B., ... Mount Pleasant.
Department of Animal Husbandry.

THE EXPERIMENT STATION STAFF.

ADMINISTRATION.

WILLIAM P. BROOKS, Ph.D., ... 6 Farview Way.
Director.
JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Vice-Director.
FRED C. KENNEY, ... Mount Pleasant.
Treasurer.
CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.

DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., ... 6 Farview Way.
Agriculturist.
HENRY J. FRANKLIN, Ph.D., ... Wareham.
In charge of Cranberry Investigation.
EDWIN F. GASKILL, B.Sc., ... North Pleasant Street.
Assistant Agriculturist.

DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

GEORGE E. STONE,[1] Ph.D., ... Mount Pleasant.
Botanist and Plant Pathologist.
GEORGE H. CHAPMAN, M.Sc., ... 13 Fearing Street.
Assistant Botanist.
ORTON L. CLARK, B.Sc., ... Mount Pleasant.
Assistant Botanist.

DEPARTMENT OF ENTOMOLOGY.

HENRY T. FERNALD, Ph.D., ... 44 Amity Street.
Entomologist.
BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Apiarist.
ARTHUR I. BOURNE, A.B., ... 12 East Pleasant Street.
Assistant Entomologist.

DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Chemist.
EDWARD B. HOLLAND, M.Sc., ... 28 North Prospect Street.
Associate Chemist, in charge of Research Division.
FRED W. MORSE, M.Sc., ... 40 Pleasant Street.
Research Chemist.
HENRI D. HASKINS, B.Sc., ... 14 Amity Street.
In charge of Fertilizer Division.
PHILIP H. SMITH, M.Sc., ... 102 Main Street.
In charge of Feed and Dairy Division.
LEWELL S. WALKER, B.Sc., ... 19 Phillips Street.
Assistant.
RUDOLPH W. RUPRECHT, M.Sc., ... 32 North Prospect Street.
Assistant.

[1] On leave of absence; Associate Professor Osmun acting as head of Department of Botany.

CARLTON P. JONES, M.Sc., Assistant. 30 North Prospect Street.
CARLOS L. BEALS, B.Sc., Assistant. Sunderland.
WALTER S. FROST, B.Sc., Assistant. 24 Pleasant Street.
JAMES P. BUCKLEY, Jr., Assistant. 29 Lincoln Avenue.
JAMES T. HOWARD, Collector. 154 Main Street.
HARRY L. ALLEN, Assistant. 89 Main Street.
JAMES R. ALCOCK, Assistant. North Amherst.

DEPARTMENT OF HORTICULTURE.

FRANK A. WAUGH, M.Sc., Horticulturist. Campus.
FRED C. SEARS, M.Sc., Pomologist. Mount Pleasant.
JACOB K. SHAW, Ph.D., Research Pomologist. 1 Allen Street.
JOHN B. NORTON, B.Sc., Graduate Assistant. 84 Pleasant Street.

DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., Meteorologist. 33 North Prospect Street.

DEPARTMENT OF POULTRY HUSBANDRY.

JOHN C. GRAHAM, B.Sc.Agr., In charge of Department. Lincoln Avenue.
HUBERT D. GOODALE, Ph.D., Research Biologist. North Amherst.

DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., Veterinarian. 42 Lincoln Avenue.

THE EXTENSION SERVICE STAFF.

WILLIAM D. HURD, M.Agr., Director of the Extension Service and Supervisor of Short Courses. 46 Amity Street.
EARNEST D. WAID, B.Sc.Agr., Assistant Director. 61 Amity Street.
ORION A. MORTON, Extension Professor of Agricultural Education. Lincoln Avenue.
EZRA L. MORGAN, A.M., Extension Professor of Community Planning. 2 Allen Street.
LAURA COMSTOCK, Extension Professor of Home Economics. 84 Pleasant Street.
RICHARD H. FERGUSON, B.Sc.Agr., Extension Professor of Agricultural Economics. 5 School Street.
GEORGE F. E. STORY, B.Sc., Extension Instructor in Animal Husbandry. 10 Allen Street.
RALPH W. REES, A.B., B.Sc., Extension Instructor in Pomology. 24 Pleasant Street.
HERBERT J. BAKER, B.Sc., Extension Instructor in Farm Management. 24 Pleasant Street.
PHILIP H. ELWOOD, Jr., B.Sc.Agr., Extension Instructor in Civic Improvement. 24 Pleasant Street.
ALLISTER F. McDOUGALL, B.Sc., Extension Instructor in charge of Demonstration Auto Truck. 24 Pleasant Street.

ERWIN H. FORBUSH, ... 8 Nutting Avenue.
Supervisor of Correspondence Courses.
ETHEL H. NASH, ... 16 Nutting Avenue.
Extension Instructor in Agricultural Education.
HARRIET J. HOPKINS, B.Sc., ... 79 Pleasant Street.
Extension Instructor in Home Economics.
BENJAMIN W. ELLIS, B.Sc., ... 24 Pleasant Street.
Extension Instructor in Farm Demonstration.
LAWRENCE B. BOSTON,[1] Sandwich.
Agricultural Adviser, Barnstable County.
JOHN A. SCHEUERLE,[1] Springfield.
Secretary, Hampden County Improvement League.

THE CLERICAL STAFF.

CLARISSA G. BABCOCK, B.Sc., ... 77 South Pleasant Street.
Library Assistant.
FRANCES C. BOYNTON, A.B., ... 44 Triangle Street.
Clerk, Department of Farm Administration.
MARY E. CALDWELL, ... Draper Hall.
Cashier.
MABEL R. CASE, A.B., ... 9 Phillips Street.
First Clerk, Extension Service.
ADA M. CHANDLER, A.B., ... 3 Fearing Street.
Cataloguer, Library.
LENA V. CHAPMAN, ... 77 South Pleasant Street.
Library Assistant.
BERTHA E. CHRISTIANSEN, A.B., ... 25 Pleasant Street.
Assistant to the Dean.
LUCIA G. CHURCH, ... North Amherst.
First Clerk, Experiment Station.
JESSIE V. CROCKER, ... Sunderland.
Clerk, Department of Botany.
MARION S. DONALDSON, B.Sc., ... 9 Phillips Street.
Stenographer, Department of Agricultural Education.
LINA E. FISHER, ... 28 Pleasant Street.
Stenographer, Department of Chemistry.
GRACE E. GAILOND, ... 28 Pleasant Street.
Stenographer, Experiment Station.
ALICE M. GILBERT, ... Draper Hall.
Clerk, Department of Dairying.
LILLIAN M. GELINAS, ... 77 Pleasant Street.
Clerk, President's Office.
HANNAH M. GRIFFIN, A.B., ... 9 Phillips Street.
Clerk, Department of Farm Administration.
CORA B. GROVER, ... North Amherst.
Clerk, Extension Service.
MARION GUERTIN, ... 20 Pleasant Street.
Stenographer, Department of Beekeeping.
MARY E. HORTON, ... 15 Fearing Street.
Clerk, President's Office.
ESTHER L. HOUGHTON, A.B., ... Draper Hall.
Clerk, Department of Microbiology and Division of the Humanities.
ALICE M. HOWARD, ... North Amherst.
First Clerk, Experiment Station.
LORIAN P. JEFFERSON, A.M., ... 84 Pleasant Street.
Expert Secretary, Division of Rural Social Science.
REBECCA L. MELLOR, ... 7 Northampton Road.
Clerk, Experiment Station.
FAY L. MILTON, ... Draper Hall.
Clerk, Department of Poultry Husbandry.

[1] Gives part-time service to the Massachusetts Agricultural College.

NELL C. MILTON, ... Draper Hall.
Stenographer, Division of Rural Social Science.
ELIZABETH E. MOONEY,[1] Northampton.
Stenographer, Department of Poultry Husbandry.
GLADYS P. MOORE, ... - -
Stenographer, Treasurer's Office.
BRIDIE E. O'DONNELL, ... Hadley.
Clerk, Department of Entomology.
INA M. PAIGE, ... Draper Hall.
Stenographer, Extension Service.
HELEN C. POMEROY, ... 17 Pleasant Street.
Stenographer, Division of Horticulture.
LUTHER R. PUTNEY, ... Lincoln Avenue.
Clerk, Treasurer's Office.
GLADYS E. RUSSELL, A.B., ... 9 Phillips Street.
Clerk, Division of Horticulture.
EDNA M. SANDERS, ... Hadley.
Bookkeeper, Treasurer's Office.
ELSA SLATTERY, ... Northampton.
Stenographer, Extension Service.
DOROTHY F. SMITH, ... Draper Hall.
Clerk, Division of Horticulture.
HARRIET C. STEVENSON,[1] Woodside Avenue.
Stenographer, Department of Agricultural Economics.
OLIVE M. TURNER, B.Sc., ... 22 Spaulding Street.
Clerk, Registrar's Office.
HENRIETTA L. WEBSTER, ... Draper Hall.
First Clerk, Treasurer's Office.
AURELIA B. WENTWORTH, ... South Amherst.
Stenographer, Division of Agriculture.

STAFF OF OPERATING AND MAINTENANCE.

JOHN J. BARBER, ... Campus.
Farm Superintendent.
JOHN L. BYARD, ... 21 Pleasant Street.
Superintendent of the Apiary.
WILLIAM CHESLEY, ... Draper Hall.
Steward of the Dining Hall.
LAWRENCE S. DICKINSON, B.Sc., ... 2 Farview Way.
Foreman of Grounds.
CLARENCE A. JEWETT, ... 112 Pleasant Street.
Superintendent of Buildings.
JOHN J. LEE, ... East Pleasant Street.
Assistant to the Military Detail.
PERCY C. SCHROYER, B.Sc., ... 6 Phillips Street.
Assistant Engineer.
NEWTON WALLACE, ... Campus.
Electrician.
JAMES WHITING, ... 16 Hallock Street.
Foreman, Department of Floriculture.

[1] On part time.

Standing Committees of the Faculty.[1]

1914-15.

Catalogue and Other Publications.

Associate Professor Neal.
Assistant Professor Smith.
Assistant Professor Robbins.
Secretary Watts.

Commencement.

Professor Paige.
Treasurer Kenney.
Captain Martin.
Professor Lockwood.
Associate Professor Peters.
Associate Professor Nehrling.
Assistant Professor Duncan.
Secretary Watts.

Course of Study.

President Butterfield.
Professor Hart.
Professor Waugh.
Professor Foord.
Professor Sprague.
Professor Fernald.
Professor Ostrander.
Professor Marshall.
Professor Chamberlain.
Associate Professor Cance.
Assistant Professor Chenoweth.

Discipline (Advisory).

Dean Lewis.
Professor Hasbrouck.
Associate Professor Hicks.
Assistant Professor Mackimmie.
Assistant Professor Machmer.

Employment.

Professor Sears.
Dean Lewis.
Treasurer Kenney.
Associate Professor Haskell.

Entrance Examinations and Admission.

Professor Hasbrouck.
Professor Graham.
Associate Professor Osmun.
Assistant Professor Ashley.
Assistant Professor Machmer.
Mr. Rand.

[1] The president of the college is ex officio member of each standing committee.

HEALTH AND SANITATION.

Professor MARSHALL.
Treasurer KENNEY.
Captain MARTIN.
Professor LOCKWOOD.
Associate Professor HICKS.
Miss COMSTOCK.

LIBRARY.

Professor STONE.
Professor MARSHALL.
Professor WELLINGTON.
Professor SPRAGUE.
Mr. GREEN.

SCHEDULE.

Professor LOCKWOOD.
Associate Professor PETERS.
Assistant Professor MACHMER.

SCHOLARSHIP.

Associate Professor GORDON.
Dean LEWIS.
Professor HASBROUCK.
Assistant Professor MACKIMMIE.
Assistant Professor HARRISON.
Assistant Professor MACHMER.

STUDENT LIFE.

President BUTTERFIELD.
Dean LEWIS.
Director HURD.
Treasurer KENNEY.
Professor CHAMBERLAIN.
Professor SPRAGUE.
Professor HART.
Professor CLARK.
Associate Professor MCLEAN.
Associate Professor HASKELL.
Associate Professor CRAMPTON.
Associate Professor HICKS.
Associate Professor ANDERSON.
Assistant Professor MACKIMMIE.
Assistant Professor QUAIFE.
Secretary WATTS.
Assistant Professor DUNCAN.
Assistant Professor MACHMER.
Mr. PRINCE.

UNCLASSIFIED STUDENTS.

Professor LOCKWOOD.
Professor SEARS.
Associate Professor PETERS.

APPOINTED TO ATHLETIC BOARD.

Dean LEWIS.
Professor HASBROUCK.
Associate Professor OSMUN.

THE COLLEGE.

Admission.

A. Application for Admission.

All correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. Modes of Admission.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

Certificates. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England will be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates must present not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

Examinations. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.[1]

[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units of the preparatory subjects, applicants may be admitted upon examination, with a condition in English, provided that they show, upon examination, preparation in work entitling them to a ranking of 60 or higher.

Students so admitted, must, to remove the condition, pass an examination covering the regular three-units requirement.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

In June,	Amherst, Department of Physics building.
	Boston, College of Liberal Arts, Boston University.
	Worcester, Horticultural Hall.
In September,	Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 17–19, inclusive, 1915. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M.	Registration.[1]
8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Algebra.
3.30 P.M.	Physics.

Second Day.

8.00 A.M.	Required English.
11.00 A.M.	Solid geometry.
2.00 P.M.	History, required and elective.

Third Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1914, the examinations will be given September 8–11, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M.	Registration.
1.15–5.00 P.M.	Greek A and B.

Second Day.

8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Algebra.
3.30 P.M.	Physics.
4.30 P.M.	Elective English.

Third Day.

8.00 A.M.	Required English.
11.00 A.M.	Solid geometry, agriculture.
2.00 P.M.	History, required and elective.

Fourth Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

[1] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

C. Requirements for Admission.

The requirements for admission are based on the completion of a four-years high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year. **Neither more nor less credit will be given in any subject than is indicated in the table below.** Fourteen units must be offered for admission. In the list given below, *every subject in black-faced type is absolutely required and no substitution is allowed.* The subjects so typed total eight and one-half units. In addition to these points five and one-half more units must be chosen from the subjects printed in light-faced type. Not more than four half-credit units may be offered.

Agriculture,[1]	½ or 1
Botany,[2]	½ or 1
Chemistry,[2]	1
Algebra,	1½
Plane geometry,	1
Solid geometry,	½
Trigonometry,	½
Physics,[2]	1
Geology,[2]	½
Physiography,	½
Physiology,	½
Zoölogy,[2]	½
History[3] (Ancient; Medieval and Modern; English; General; United States and Civics), *any one,*	1[4]
English,	3
English (elective),[1]	1
Modern Language (elementary French or elementary German),	2
Elementary French,[5]	2
Elementary German,[5]	2
Intermediate French,	1
Advanced French,	1
Intermediate German,	1
Advanced German,	1
Greek A,[1]	2
Greek B,[1]	1
Latin A,	2
Latin B,	1
Commercial geography,[6]	½
Drawing,[6]	½
Manual training,[6]	½ or 1

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, page 25).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books; but their certificates must state that note-books have been satisfactorily completed.

[1] Examination in September only.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] One must be offered for the required point, one, two or three others may be offered for elective points.

[4] For each offered.

[5] May be offered as elective if not offered to satisfy *required* points.

[6] On certificate only, no examination given.

D. Statement of Preparation Required for Admission.

Agriculture. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade. **The examination in agriculture will be given in September only.**

Botany. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Steven's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

Mathematics. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the

sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

Physics. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Text-book of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

Physiology. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

Zoölogy, Physiography, Geology. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

History. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers,

in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery in United States history and civics.

English. — For 1915–19 inclusive: —

The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

Grammar and Composition. — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

Literature. — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. Reading. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I.: —

Group I. Classics in Translation: The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any selection from group I. a selection from any other group may be substituted.

Group II. Shakspere: "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo

and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"[1] "Macbeth;"[1] "Hamlet."[1]

Group III. Prose Fiction: Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voyages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one;* Jane Austen's novels, any *one;* Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens's novels, any *one;* Thackeray's novels, any *one;* George Eliot's novels, any *one;* Mrs. Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reade's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevenson's "Treasure Island" or "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one;* Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables" or "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

Group IV. Essays, Biography, etc.: Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tatler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" selections from Irving's "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" selections from Lamb's "Essays of Elia" (about 100 pages); selections from Lockhart's "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison and Steele in the English Humorists;" Macaulay: any one of the following essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay;" selections from Trevelyan's "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years before the Mast;" Lincoln's "Selections," including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address, the letter to Horace Greeley, together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson and later writers; a collection of "Letters" by various standard writers.

Group V. Poetry: Palgrave's "Golden Treasury" (first series), books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury" (first series), Book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens" and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake," or "Marmion;"

[1] If not chosen for study under B.

Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The Armada," "Ivry;" Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum" and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

B. Study. — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. Drama: Shakspere's "Julius Cæsar," "Macbeth," "Hamlet."

Group II. Poetry: Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

Group III. Oratory: Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

Group IV. Essays: Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading. For this purpose the examiner will provide several subjects, perhaps eight or ten, from which the candidate may make his own selections. He will not be expected to write more than four hundred words per hour.

The examination in literature will include: —

(*a*) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above. The candidate will be required to submit a list of the books read in preparation for the examination, certified by the principal of the school in which he was prepared; but this list will not be made the basis of detailed questions.

(*b*) A test on the books prescribed for study, which will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

The Massachusetts Agricultural College calls attention to the following recommendations of the national conference, which agree with its policy: —

1. That colleges so desiring may set an examination requiring no prescribed books, but testing the same general kind of preparation as that indicated in the foregoing requirements.

2. That individual colleges take such steps as may be found necessary to ascertain whether candidates for entrance possess an adequate equipment in oral English.

As rapidly as seems expedient the college will proceed in accordance with these recommendations. Schools wishing to present candidates prepared in conformity to the intent of the recommendations will have the co-operation of the college.

English, Elective. — To secure a fourth entrance credit in English, the applicant should do (*a*) the full equivalent of three years' work (required English), and also (*b*) the full equivalent of a fourth year's work. Applicants not certified with a fourth entrance credit will be examined, provided that the applicant, on or before June 1, notify the Department of English of his intention to take the examination, and supply thereafter the information needed by the department to prepare the examination questions. The information blanks will be forwarded by the Department of English upon receipt of the notice. (**The examination in English elective will be given in September only.**)

Subjects accepted. — The applicant may offer (*a*) any one of the subjects stated hereunder, or (*b*) any two of these subjects in combination.

(*a*) History of American literature.

(*b*) History of English literature (or lives of the great authors).

(*c*) Classics *other than those read to meet the three-credit requirement.*

(*d*) Advanced composition.

(*e*) History of the English language.

(*f*) Advanced high school grammar.

Advanced Standing in College. — Whether advanced standing shall be given applicants entering with a fourth credit in English will be determined by consideration of each case individually. Much weight is given to the ability of the student to express himself correctly and clearly, to think clearly, and to grasp the meaning of printed language. A special examination will be given in the opening week of college, notice of which will be posted on the English bulletin board, for freshmen who wish to apply for advanced standing.

Presentation of Note-books and Themes. — Applicants for examination, either for fourth-unit credit or for advanced standing, are advised to present the note-books, themes, etc., prepared by them in the preparatory school, as an aid toward determining their proficiency.

French. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

German. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

Greek. — Greek will receive credit as an elective requirement upon either examination or certification, as follows. **(The examination in Greek A and Greek B will be given in September only.)**

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

Latin. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

Commercial Geography.[1] — Preparation should be made in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work. (No examination given.)

Drawing.[1] — The applicant may offer either freehand or mechanical drawing or both. He must be able to make an accurate freehand sketch in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable him to draw correctly a simple geometric model from memory; or, if he present mechanical drawing, he must have working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented, see "Manual Training." (No examination given.)

Manual Training.[1] — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

E. Admission to Advanced Standing.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. Other Information about Entrance.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted.
4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination, in the week following

[1] On certificate only; no examination given.

the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

G. Unclassified Students.

All requests for information concerning admission of unclassified students should be addressed to Professor W. P. B. Lockwood, chairman of committee on unclassified students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

9. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

10. No unclassified student shall be allowed to participate in any intercollegiate contests.

Courses of Instruction.

A. TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.[1]

The figures indicate the number of credit hours a week. For details, see the descriptions of courses.

Freshman Year.

First Semester.

All work required.

Subjects.	Hours per Week.
Chemistry,	3
Algebra,	3
Solid Geometry,[2]	2
English,	4
Public Speaking (at option of instructor),	1
French or German,[3]	4
Drill,	1
Hygiene,	1
College Life (attendance without credit).	
	18 or 19

Second Semester.

All work required.

Subjects.	Hours per Week.
Animal Husbandry,	2
Chemistry,	3
Trigonometry,	3
Algebra,	2
English,	4
Public Speaking (if not taken in semester one),	1
French or German,	4
Drill,	1
Physical Education,	1
	20 or 21

[1] Applies to the classes of 1917 and 1918 only. See next page for course of study for class of 1919.

[2] To be taken in course when not offered for entrance.

[3] Students who have had three or four years of one language in the preparatory school will elect the other language. Students who have had two years of one language may have their choice of election. Whichever language they so elect must be continued to the end of the first semester of the sophomore year. Eleven college credits are required in this language.

SOPHOMORE YEAR.

First Semester.

All work required except Chemistry or Animal Husbandry.

Subjects.	Hours per Week.
Agronomy,	3
Physics,	5
Zoölogy,	3
English,	2
French or German,	3
Tactics,	1
Drill,	1
	18
[Chemistry or Animal Husbandry (may be elected subject to approval by the dean),	3]
	[21]

Second Semester.[1]

Required.

Subjects.	Hours per Week.
Elementary Horticulture,	2
Botany,	4
English,	2
Agricultural Industry,	3
Drill,	1
Tactics,	1
Physical Education,	1
	14

Elective.

French or German, Geology, Physics, Chemistry, Surveying,	Each 3 hours.	Any two,	6
			20

The following table shows the course of study that will be in effect with the entrance of the class of 1919: —

FRESHMAN YEAR.

First Semester.		*Second Semester.*	
English and Public Speaking,	4 or 3	English and Public Speaking,	4 or 3
Algebra,	3	Trigonometry,	3
Geometry,	2	Algebra,	2
Chemistry,	3	Chemistry,	3
Drill, etc., 2; Military Tactics, 1,	3	Drill, etc., 2; Military Tactics, 1,	3
Language,	3	Agricultural Geology,	3
Agriculture and Horticulture,	2	Language,	3
	20 or 19	Agriculture and Horticulture,	2
			23 or 22

[1] All courses under "Required," with any two of those under "Elective."

SOPHOMORE YEAR.

First Semester.

Physics,	4
English,	2
Zoölogy,	3
Rural Community,	2
Drill, etc.,	2
2 or 3 electives,	6 or 9
	19 to 22

Electives (subject to Revision).

Language,	3
Mathematics,	3
Agriculture,	3
Chemistry,	3
Free-hand Drawing,	3
Anthropology,	3

Second Semester.

Agronomy,	3
English,	2
Botany,	4
Drill, etc.,	2
Agricultural Industry,	3
2 or 3 electives,	6 or 9
	20 to 23

Electives (subject to Revision).

Language,	3
Agriculture (?),	3
Chemistry,	3
Entomology,	4
Geology,	3
Surveying,	3
Horticulture,	3
Physics,	4
Zoölogy,	3
Agricultural Education (?),	3
Mechanical Drawing,	3

B. MAJORS: JUNIOR AND SENIOR YEARS.

General Statement.

A major consists of 30 hours of correlated work, to be arranged by the student and an instructor called the adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

Rules governing Majors.

Rule 1. *Election.* — Each student, in the second semester of his sophomore year, shall elect a major subject from the list of majors given below; and this major shall consist of 30 credit hours of correlated work.

Rule 2. *Minimum Credits.* — The minimum number of credits for the junior and senior years shall be 65, inclusive of Military Drill and Physical Education.

Rule 3. *Maximum Credits.* — The maximum number of credits for any semester of the junior or senior year shall be 21.

Rule 4. *Humanities and Rural Social Science.* — A minimum of 12 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 3 credit hours will be required in each of the divisions.

Rule 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 30 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

Rule 6. *Free Electives.* — Each student is required to take 30 hours in his major and also 12 hours in the Divisions of the Humanities and Rural Social Science, making a total of 42 hours. He is allowed free choice of courses to complete his required hours, this remainder amounting to 17 hours minimum, or 37 hours maximum for the two years.

Rule 7. *Registration.* — No upper classman shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office on June 1.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the year and countersign the card.

(3) Each course card must be filled out, giving the name of student, his college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours of free elections added by the student, the card must be returned to the registrar not later than June 10.

Rule 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by the committee on scholarship, they become operative at the beginning of the semester following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

LIST OF MAJORS.

Agriculture.

Professor James A. Foord, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 6,	3
Animal Husbandry 3,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Dairying 1,	3
Dairying 2,	3
Farm Administration 3,	3
Farm Administration 4,	3
Microbiology 1 and 2,	5
	32

Chemistry 7 and 8, Veterinary Science 1, Microbiology 2, Pomology 1 and Animal Husbandry 6 are suggested as additional courses for the student fitting himself for general agriculture.

Agronomy.

Associate Professor Sidney B. Haskell, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 4,	3
Agronomy 5,	3
Agronomy 6,	3
Agronomy 8,	3
Animal Husbandry 9,	3
Farm Administration 4,	3
Chemistry 5,	5
Chemistry 6,	5
	31

Animal Husbandry.

Associate Professor J. Allan McLean, Adviser.

Course.	Credit.
Agronomy 3,	3
Veterinary Science 1, Veterinary Hygiene and Stable Sanitation,	3
Veterinary Science 2, General Veterinary Pathology (Materia Medica and Therapeutics),	3
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 10,	3
Animal Husbandry 11,	2
Dairying 1,	3
Farm Administration 3,	3
Farm Administration 4,	3
	32

Dairying.

Professor William P. B. Lockwood, Adviser.

Course.	Credit.
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 11,	2
Dairying 1,	3
Dairying 2,	3
Dairying 3,	3
Microbiology 11 and 12,	3
Farm Administration 3,	3
Farm Administration 4,	3
	29

Poultry Husbandry.

Professor John C. Graham, Adviser.

Course.	Credit.
Poultry Husbandry 1,	2
Poultry Husbandry 2,	2
Poultry Husbandry 3,	1
Poultry Husbandry 4,	1–3
Poultry Husbandry 5,	1
Poultry Husbandry 6,	3
Poultry Husbandry 7,	3
Poultry Husbandry 9,	3
Pomology 1,	3
Agronomy 3,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Veterinary Science 7,	3
	31–33

Floriculture.

Associate Professor Arno H. Nehrling, Adviser.

Course.	Credit.
Floriculture 1,	4
Floriculture 2,	4
Floriculture 3,	3
Floriculture 4,	3
Horticulture 3,	3
Horticulture 4,	3
Entomology 1,	3
Market Gardening 2,	3
Botany 2,	4
	30

Note. — Horticulture 3 and 4 is a junior subject, but to balance the work for the two years it would be better for the floricultural students to take the course in the senior year.

Forestry.

Professor WILLIAM D. CLARK, Adviser.

Course.	Credit.
Forestry 3,	3
Forestry 4,	3
Forestry 5,	5
Forestry 6,	3
Entomology 5,	3
Landscape Gardening 1,	3
Horticulture 3,	3
Horticulture 4,	3
Botany 13,	4
	30

Students who propose to major in Forestry should elect Geology and Surveying in sophomore year.

Landscape Gardening.

Professor FRANK A. WAUGH, Adviser.

Course.	Credit.
Landscape Gardening 1,	3
Landscape Gardening 2,	3
Landscape Gardening 3,	3
Landscape Gardening 4,	3
Landscape Gardening 5,	2
Landscape Gardening 6 or 10,	2
Landscape Gardening 7,	3
Landscape Gardening 8,	3
Drawing 1,	3
Drawing 2,	3
Horticulture 3,	3
	31

Courses for juniors *only:* Landscape Gardening 1 and 2, Drawing 1 and 2.
Courses for seniors and graduates *only:* Landscape Gardening 3, 4, 7 and 8.
Courses open to juniors and seniors, both if possible: Horticulture 3 and 4.
This grouping of subjects is offered only as an example. Other groupings may be approved by the adviser, but such other groupings must be subject to the class schedule.

Pomology.

Professor FRED C. SEARS, Adviser.

Course.	Credit.
Pomology 1,	3
Pomology 2,	3
Pomology 3,	3
Pomology 4,	3
Pomology 5,	3
Pomology 6,	2
Botany 5,	2
Agronomy 5,	3
Entomology 1,	3
Entomology 2,	3
	28

Agricultural Chemistry.

Associate Professor CHARLES A. PETERS, Adviser.

Course.	Credit.
Chemistry 5,	5
Chemistry 6,	5
Chemistry 9,	5
Chemistry 10,	5
Chemistry 11,	5
Chemistry 12, 14 or 16,	5
Chemistry 13,	3
Chemistry 15,	3
Chemistry 18,	2
	38

The major will consist of 30 credit hours selected from this list. The student will be advised concerning other subjects suitable to be taken in connection with Chemistry.

Economic Entomology.

Professor HENRY T. FERNALD, Adviser.

Course.	Credit.
Entomology 1,	3
Entomology 2,	2
Entomology 3,	4
Entomology 4,	4
Entomology 5,	3
Entomology 8,	3
Botany 3,	4
Botany 4,	3
Zoölogy 3,	3
Zoölogy 4,	3
	32

A major in Economic Entomology does not necessarily include all the subjects given in this list, but may be varied to some extent, in accordance with the future plans of the student, other modifications being permissible.

Microbiology.

Professor CHAS. E. MARSHALL, Adviser.

Course.	Credit.
Microbiology 1 or 2,	5
Microbiology 3 or 4,	5
Microbiology 5 or 6,	3
Microbiology 7 or 8,	3
Chemistry 3,	5
Chemistry 4,	5
Chemistry 5,	3
Chemistry 6,	3
	32

Courses 9 in Chemistry; 3, 4, 5 in Botany; 3, 4, 5, 6 in Zoölogy; 1, 3, 5, 6 in Veterinary Science, together with German and French, are suggested as collateral lines. Dairying 1 and Agronomy 5 are essential to a grasp of the larger problems involved in Microbiology as applied to Agriculture.

Plant Physiology and Pathology.

Professor George E. Stone,[1] Adviser.

Course.	Credit.
Botany 3,	4
Botany 4,	3
Botany 9,	4 or 5
Botany 10,	4 or 5
Botany 11,	4
Botany 12,	4
Chemistry 5,	5
Chemistry 6,	5
	33 or 35

Agricultural Education.

Professor William R. Hart, Adviser.

Course.	Credit.
Agricultural Education 1,	3
Agricultural Education 2,	3
Agricultural Education 3,	3
Agricultural Education 4,	3
Agronomy 3,	3
Dairying 5,	2
Farm Administration 3,	3
Poultry Husbandry 1,	2
Market Gardening 2, Agronomy 5,	3
Botany 5,	2
Pomology 1,	3
	30

Some substitutions of other technical courses for some of the technical courses above mentioned will be made to meet the needs of individual students.

Rural Social Science.

Associate Professor Alexander E. Cance, Adviser.

Course.	Credit.
Economics and Sociology 1,	3
Agricultural Economics 3,	3
Agricultural Economics 7,	3
Agricultural Economics 6 or 8,	3
Rural Sociology 1,	3
Rural Sociology 4,	1
Rural Sociology 5,	3
Rural Sociology 8 or 10,	3
Rural Sociology 11,	3
Farm Administration 4,	3
	28

[1] On leave of absence; Associate Professor Osmun acting as head of Department of Botany.

Summary.

There are four preliminary steps which a student should take in arranging for his major work.

1. Select a major.

2. Confer with major adviser for arrangement of courses, the plan to be approved by adviser in accordance with Rule 5 previously stated.

3. Select courses covering the four semesters of the junior and senior years in such a way that a minimum of 12 credits will be taken in the two divisions, the Humanities and Rural Social Science; the distribution of all but 3 of these credits may be decided by the student.

4. Choose other courses so that the total number of credits for any semester shall be not less than 16 nor more than 21. (See Rules 2 and 3.)

C. UNDERGRADUATE COURSES.

All courses given in the *first semester bear odd numbers*; all given in the *second semester bear even numbers*. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of the Book of Rules.

DIVISION OF AGRICULTURE.

Professor Foord.

AGRONOMY.

Associate Professor Haskell, Dr. Brooks, Assistant Professor McDonald, Mr. Merkle.

Required Course.

1. Soils and Fertilizers. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 hours. Credit, 3.

Associate Professor Haskell and Assistant Professor McDonald.

Elective Courses.

3. Field and Forage Crops. — History, classification, production, harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage and root crops suitable to New England conditions. The work includes lecture, laboratory and field study of these various crops. Prerequisites, Agronomy 1 and Botany 2. For juniors primarily; 1 lecture and 2 laboratory periods. Credit, 3.

Assistant Professor McDonald.

4. Advanced Field Crops. — Commercial production of grain, hay and root crops. Lecture, laboratory, and field study of the purity, quality, and vitality of the seed of these crops and the handling, grading and judging of their products. The work offered will not be confined to New England conditions. Prerequisite, Agronomy 3. For juniors primarily; 2 lectures and 1 laboratory period. Credit, 3. Assistant Professor McDonald.

5. Advanced Soils. — A field, laboratory and lecture course on soils, their nature, composition, physical qualities, improvement. Field work, as far as the season allows, consists of detailed soil surveys in different parts of the Connecticut valley; this followed by laboratory work on the physical properties of the soil collected, on the effect of fertilizers on the soil, and on the mixing of fertilizers. Prerequisite, Agronomy 1. For seniors primarily; 1 lecture period and 1 4-hour laboratory period weekly. Credit, 3.

Associate Professor Haskell.

6. Drainage and Irrigation. — A field and lecture course on soil improvement, by drainage and irrigation. As a thesis each man is required, after studying an area of wet or swampy land, to present plans and estimates for its reclamation. Prerequisites, Agronomy 1 and Mathematics 6. Juniors and seniors; 1 lecture period and 1 4-hour laboratory period weekly. Credit, 3.

Associate Professor Haskell.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, on manures and fertilizers. This course is intended for seniors only. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3.

Associate Professor Haskell.

10. Breeding of Field Crops. — This course deals with the improvement, by selection and breeding, of the crops studied in courses 3 and 4. Prerequisite, Agronomy 4. Seniors only; 2 lecture periods weekly. Credit, 2.

Associate Professor Haskell.

ANIMAL HUSBANDRY.

Associate Professor McLean, Assistant Professor Quaife.

Required Course.

2. Market Classes and Grades of Live Stock. — A study of the different market classes and grades of horses, cattle, sheep and swine. The purpose of this course is to familiarize beginners with the different classes of stock, and to give them a grounding in live stock judging. Text-book, Craig's "Live Stock Judging." Freshmen; 2 laboratory periods. Credit, 2.

Associate Professor McLean and Assistant Professor Quaife.

Elective Courses.

3. Breeds and Types of Live Stock. — A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Text-book, Plumb's "Breeds and Types of Farm Animals." Prerequisite, Animal Husbandry 2. Sophomores; 2 lectures and 2 laboratory periods. Credit, 4.

Associate Professor McLean and Assistant Professor Quaife.

5. Principles of Breeding. — This course is designed to familiarize the student with the problems involved in animal and plant improvement; to acquaint him with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; De Vrie's

theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live stock improvement. Text, "Genetics," by Herbert E. Walter. Supplementary reading. Prerequisite, Zoölogy 1; 3 lectures. Credit, 3. Associate Professor McLean.

6. Live-stock Management. — The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, breaking to drive, driving, harnessing, casting and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work. Prerequisite, Animal Husbandry 3. Juniors; 1 laboratory period. Credit, 1.

Assistant Professor Quaife.

8. Advanced Stock Judging. — This course is designed to equip Animal Husbandry students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits will be made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected largely from this class. Must be preceded by or accompany Animal Husbandry 6. Juniors; 2 laboratory periods. Credit, 2.

Associate Professor McLean.

9. Feeding and Management. — A study of the principles of animal nutrition; of the composition and qualities of feeding materials; of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production. Text-book, Henry's "Feeds and Feeding." Prerequisite, Chemistry 5 or 7. Seniors; 3 lectures. Credit, 3.

Assistant Professor Quaife.

10. Feeding and Management. — A continuation of Course 9, dealing in a similar manner with horses, sheep, beef cattle and swine. Prerequisite, Course 9. Seniors; 3 lectures. Credit, 3. Assistant Professor Quaife.

11. Herd and Stud-book Study. — An advanced course in the study of the breeds of live stock, familiarizing the student with the detailed history of the breed, the most productive sires and dams of the various breeds, and the successful lines and methods of breeding. Prerequisites, Animal Husbandry 5 and 8. Seniors; 2 hours. Credit, 3. Associate Professor McLean.

12. Seminar. — Advanced study upon questions pertaining to live stock and live-stock production. Each student electing this work will choose some particular line of work in which he is specially interested, and will pursue study in this subject by reading, compilation and research. There will be no regular lecture period, but seminars will be held. A satisfactory report of the results must be presented in a thesis. Open only to seniors majoring in Animal Husbandry. Credit, 1. Associate Professor McLean.

DAIRYING.

Professor Lockwood, Mr. Coons, Mr. Baldinger.

Elective Courses.

1. Milk and Milk Composition. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems. Two lecture hours and 1 2-hour laboratory period. Credit, 3.

Professor Lockwood and Mr. Coons.

2. Buttermaking. — A study of separators and cream separation; handling milk and cream for buttermaking; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof. Prerequisite, Course 1; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Professor Lockwood, Mr. Coons and Mr. Baldinger.

3. Market Milk and Milk Products. — A study of market milk conditions, extent and development of the business; supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection. The manufacture of milk products other than butter, including cheese, condensed milk, cottage cheese, casein, milk powder, ice cream, etc. Prerequisites, Dairying 1, and Bacteriology 1; 2 lecture hours and 1 2-hour laboratory period. Credit, 3. Professor Lockwood and Mr. Baldinger.

4. Dairying. — A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary buttermaking; proper methods of handling milk and cream; and the relation of market milk to the public health. One lecture hour and 2 2-hour laboratory periods. Credit, 3.

Professor Lockwood.

FARM ADMINISTRATION.

Professor Foord.

Elective Courses.

3. Farm Buildings and Machinery. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisites, Agronomy 1, Animal Husbandry 2, Physics 1. Primarily for seniors; 2 laboratory periods and 1 lecture hour. Credit, 3.

Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3, Animal Husbandry 2 or 3. Primarily for seniors; 2 lecture or recitation hours and 1 laboratory period. Credit, 3. Professor Foord.

POULTRY HUSBANDRY.

Professor Graham, Dr. Goodale, Mr. Payne.

Elective Courses.

1. Elements of Poultry Culture. — This course consists of a comprehensive study of poultry-house construction, poultry-house equipment, winter-egg production, types and breeds of poultry. Juniors; 2 lectures. Credit, 2. Professor Graham.

2. Elements of Poultry Culture. — This is a continuation of Course 1, treating the subjects of incubation, brooding, care of growing stock, market poultry, including capons, roasters and broilers, and diseases of poultry. Juniors; 2 lectures. Credit, 2. Professor Graham.

3. Poultry Practice Work. — This is a practical laboratory course in poultry carpentry, caponizing, killing and picking; dressing and packing poultry, sorting and preparing eggs for market. Must be preceded or accompanied by Course 1. Juniors; 1 laboratory period. Credit, 1. Mr. Payne.

4. Incubation and Brooding. — In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg, and the care of sitting hens. This course must be preceded or accompanied by Course 2. Juniors; time to be arranged. Credit, 1 to 3. Mr. Payne.

6. Poultry Management. — In this course a detailed study of large poultry farms and equipment, such as bone cutters, feed cutters, cramming machines, etc., will be carried on. It includes the laying out and planning of poultry buildings of all kinds, the mating of fowls, and the preparing of birds for exhibition. Attention to poultry diseases and investigation work carried on by experiment stations is prominent in this course. A few good poultry plants will be visited by the class for practical demonstrations. Prerequisites, Courses 1, 2, 3 and 4. Seniors; 2 lectures, 1 laboratory period. Credit, 3. Professor Graham and Mr. Payne.

7. Advanced Poultry Judging. — This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text. Prerequisites, Courses 1, 2, 3, 4 and 5. Seniors; 1 lecture and 2 laboratory periods. Credit, 3. Mr. Payne.

8. Investigational Work. — This course is designed especially for students who are planning to do experiment station work. Students will be assigned specific problems to work out experimentally, or they may be required to assist in carrying on such work. Credit, 1 to 3. Dr. Goodale.

9. Market Poultry and Poultry Products. — This course includes the study of market classifications of poultry, eggs and feathers; the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course. Prerequisites, Courses 1, 2 and 3. Seniors; 1 lecture or conference period and laboratory periods to be arranged. Credit, 3. Mr. Payne.

10. Pen Management. — This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls, and profit and loss; must be preceded or accompanied by Course 1. Juniors; time to be arranged. Credit, 1. Mr. Payne.

RURAL ENGINEERING.

Associate Professor Gunness.

Elective Courses.

3. Farm Structures. — A study of the strength, durability and cost of building materials; location and planning of farm buildings; water supply; lighting and heating systems for the farm; drawing plans, writing specifications and estimating cost of buildings. Concrete construction as applied to foundations, silos, tanks, posts, floors and walks. One lecture and 2 laboratory periods. Credit, 3. Associate Professor Gunness.

4. Farm Machinery. — A study of the care and operation of tillage, seeding, harvesting, pumping and spraying machinery; steam and gas engines. Special attention will be given to the use of power on the small farm. Practice in the adjustment of the various machines, babbitting and fitting bearings, lining shafts and pulleys, lacing belts, splicing rope and packing valves. One lecture, and 2 laboratory periods. Credit, 3.

Associate Professor Gunness.

DIVISION OF HORTICULTURE.

Professor Waugh.

[The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.]

2. Nursery Practice. — This course treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums. Sophomores, 1 lecture period and 1 laboratory period. Credit, 2. Assistant Professor Chenoweth.

Elective Courses (General).

3. Plant Materials. — This course aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3.

4. Plant Materials. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Prerequisite, Horticulture 3; 2 lecture periods and 1 laboratory period. Credit, 3.

6. Plant Breeding. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 2-hour laboratory period. [Not given in 1914–15.] Credit, 3.

FLORICULTURE.

Associate Professor Nehrling, Mr. Thurston.

Elective Courses.

1. Greenhouse Management. — This course is designed to familiarize students with the methods followed in the management of greenhouse crops. The students are instructed in the practical operation of glazing, concrete bench construction, watering, potting, fumigation, ventilating, and in the

methods of propagation of plants by seeds and cuttings. They will also be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; lectures 2, laboratory 6 hours. Credit, 5.
Associate Professor NEHRLING, Mr. THURSTON.

2. GREENHOUSE MANAGEMENT. — Continuation of Course 1. In addition, work in the use of cut flowers and plants in decorative work, the arrangement of flowers in baskets, designs, vases, table and home decorations will be considered. The design, construction, cost, maintenance, heating, ventilating of greenhouse structures, and the draughting of specifications for commercial houses and private ranges will also be studied. Juniors; lectures 2, laboratory 6 hours. Credit, 5. Associate Professor NEHRLING, Mr. THURSTON.

3. COMMERCIAL FLORICULTURE. — A detailed study will be made of the methods of culture of greenhouse plants and cut flowers for wholesale and retail markets. The care and marketing of all florists' crops will also be considered. Assigned readings on these topics. Prerequisite, Floriculture 1 and 2. Seniors; lectures 2, laboratory 3 hours. Credit, 4.
Associate Professor NEHRLING.

4. COMMERCIAL FLORICULTURE. — A continuation of Course 3. In addition, a study of the types of tropical and subtropical foliage and flowering plants used in conservatory work will be made. Prerequisite, Floriculture 1, 2 and 3. Seniors; lectures 2, laboratory 3 hours. Credit, 4.
Associate Professor NEHRLING.

FORESTRY.

Professor CLARK.

Elective Courses.

1. PRINCIPLES OF FORESTRY. — A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Two lectures; juniors and seniors; not required of students who propose to major in forestry. Credit, 2.
Professor CLARK.

2. WOOD TECHNOLOGY. — A study of the commercial woods found in the lumber markets, methods of identification, uses, strength values, technical qualities, decay and methods of preservation. Juniors; 1 lecture and 2 laboratory periods. Credit, 3. Professor CLARK.

3. DENDROLOGY. — During the first part of the semester frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Two 2-hour periods; lectures, recitations, laboratory or field work at option of instructor; juniors. Credit, 3. Professor CLARK.

4. Silviculture. — Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting. Three lectures weekly until May 1; during May and June, 1 lecture and 1 4-hour field period weekly; juniors. Prerequisite, Forestry 3. Credit, 3. Professor Clark.

5. Forest Mensuration. — Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating. Three lectures; 72 hours of field work; seniors. Credit, 5. Professor Clark.

6. Seminar — Report. — This may involve research, laboratory or field work in the investigation of some subject, together with a review of the literature relating to it and an original written report evidencing the results. Subject to be chosen in conference with Professor Clark. Seniors. Credit, 3. Professor Clark.

LANDSCAPE GARDENING.

Professor Waugh, Assistant Professor Harrison.

Elective Courses.

1. Elements of Landscape Gardening. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 6 hours a week. Credit, 3. Assistant Professor Harrison.

2. Elements of Landscape Gardening. — As stated under Course I. Prerequisite, Course 1.

3. General Design. — Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 6 hours. Credit, 3. Assistant Professor Harrison.

4. General Design. — As stated under Course 3. Prerequisite, Course 3.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2. Professor Waugh.

6. Architecture. — The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing; 2 hours. (Alternating with Course 10 and not to be given in 1913–14.) Credit, 2. Assistant Professor Harrison.

7. Civic Art. — The principles and applications of modern civic art, including city design, city improvement, village improvement and rural improvement. Prerequisites, Courses 1, 2 and 3; must be followed by Course 8; 6 hours. Credit, 3. Professor Waugh.

8. Civic Art. — As stated under Course 7. Prerequisite, Course 7

10. Construction and Maintenance. — Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc. (Alternating with Course 6.) Two hours. Credit, 2. Assistant Professor Harrison.

MARKET GARDENING.

[1]

Elective Courses.

2. Elements of Market Gardening. — A course designed for an introduction to market gardening as a business. The work consists primarily of actual field experience in handling vegetable crops from seed to maturity. This is supplemented with lectures and text-book, in which a study of methods, soils, fertilization, tillage and management is made. Juniors; 5 hours. Credit, 3.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3.

POMOLOGY.

Professor Sears, Assistant Professor Chenoweth.

Elective Courses.

1. Practical Pomology. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery stock, pruning, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 4 hours. Credit, 3. Professor Sears.

2. Practical Pomology. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 4 hours. Credit, 3. Professor Sears.

[1] Mr. Harold F. Tompson temporarily in charge.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 4 hours. Credit, 3. Assistant Professor Chenoweth.

4. Systematic Pomology. — As stated under Course 3. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 4 hours. Credit, 3.
Assistant Professor Chenoweth.

5. Commercial Pomology. — The picking, storing and marketing of fruits, including a discussion of storage houses, the picking, handling and storing of fruits, fruit packages, methods of grading and packing, manufacturing, etc. Especial emphasis is placed upon laboratory and field work, where the student is given actual practice in the picking and packing of all the principal fruits, together with the manufacture of by-products. Open only to men majoring in Pomology. Prerequisites, Horticulture 2, Pomology 1 and 2. Seniors; 1 lecture and 2 laboratory periods. Credit, 3.
Assistant Professor Chenoweth.

6. Spraying. — A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small fruit plantations. Prerequisites, Horticulture 2, Pomology 1 and 2. Seniors; 3 hours (1 lecture period and 1 laboratory period). Credit, 2. Professor Sears.

DRAWING.

Mr. Oberhelman.

Elective Courses.

1. Free-hand Drawing. — Lettering; free-hand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink. Juniors; 6 hours. Credit, 3.
Mr. Oberhelman.

2. Mechanical Drawing. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry. Juniors; 6 hours. Credit, 3.
Mr. Oberhelman.

DIVISION OF SCIENCE.

Professor Henry T. Fernald.

BOTANY.

Professor Stone,[1] Associate Professor Osmun, Mr. McLaughlin, Mr. Smith, ————.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly, wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

Required Course.

2. General Botany. — The morphology, physiology and classification of plants. This course is fundamental. Its aim is to lay a foundation for the more specialized courses in botany which follow, and to provide a general knowledge of the science for those students who will not take further work in the department. This course is prerequisite to all other courses given by the department. In the laboratory much time is devoted to study of the structure of higher or seed plants. In this work first attention is given to the cell as the unit of structure; from the cell is traced the gradual development of the tissues of the entire plant. During the spring period of the semester much practice is given in determining and naming plants, Gray's "New Manual of Botany" being employed. In connection with this work each student is required to collect and prepare an herbarium of 75 species of plants. The lectures aim to amplify and interpret the laboratory work, dealing also with the function (physiology), classification (taxonomy) and ecology of plants. Though only 1 lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 1 lecture and 3 laboratory periods. Credit, 4.

Associate Professor Osmun, Mr. McLaughlin and Mr. Smith.

Elective Courses.

3. Cryptogamic Botany. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in any of the biological sciences, and is a prerequisite of Courses 9, 10, 15 and 16. Students electing this course may attend the lectures in Course 5. Prerequisite, Course 2. Primarily for juniors. One lecture hour and 3 2-hour laboratory periods. Credit, 4.

Associate Professor Osmun and Mr. McLaughlin.

4. Cryptogamic Botany. — As stated in Course 3. Prerequisite, Course 3. One lecture hour and 2 2-hour laboratory periods. Credit, 2.

Associate Professor Osmun and Assistant.

[1] Absent on leave; Associate Professor Osmun acting as head of department.

5. Diseases of Crops. — This course comprises a study of the common diseases of crops, their nature, causes and methods of prevention and control. In the laboratory macroscopic examinations of diseases are made, and the principal experiment-station and government literature on plant diseases is read. Intended especially for students majoring in agronomy, floriculture, landscape gardening and pomology. Prerequisite, Course 2. Primarily for juniors; 1 1-hour lecture and 1 2-hour laboratory period. Credit, 2.
Professor Stone, Mr. McLaughlin and Mr. Smith.

7. Diseases of Crops. — This course is more specialized than Course 5, and is intended to meet the needs of the student who wishes to make a more thorough study of the diseases of the particular group or groups of crops in which his interest lies; *e.g.*, diseases of fruits, diseases of field crops, diseases of trees and shrubs. Laboratory work consists of microscopic and macroscopic examination of diseases, and extensive reading of literature concerning them. Prerequisite, Course 2. Students taking this course who have not previously taken Course 5 will attend the lectures in Course 5, and if they continue in botany the second semester, must take Course 8. Seniors; 1 lecture and 3 2-hour laboratory periods. Credit, 4. Associate Professor Osmun.

8. Diseases of Crops. — As stated in Course 7. Prerequisite, Course 7.

9. Plant Pathology. — This course embraces a comprehensive study of diseases of plants, including detailed training in laboratory methods and technique. Much time is devoted to the study of literature and representative life histories of pathogens, the making of pure cultures, and artificial inoculation of hosts. Students taking this course are fitted for civil service, experiment-station and college positions in plant pathology. Course 10 must follow. Prerequisites, Botany 2, 3 and 4. Seniors; 1 lecture and 4 2-hour laboratory periods. Credit, 5. Associate Professor Osmun.

10. Plant Pathology. — As stated in Course 9. Prerequisite, Course 9.

11. Plant Physiology. — This is a general course dealing with such topics as absorption, nutrition, growth, movement and the tropisms of plants, and requires previous training in organic chemistry and botany. Prerequisite, Botany 2. Seniors; 2 lectures and 3 2-hour laboratory periods. Credit, 4.
Professor Stone and Mr. McLaughlin.

12. Plant Physiology. — As stated in Course 11. Prerequisite, Course 11.

13. Shade-tree Management. — Physiology and pathology of shade-trees. This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade-trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Prerequisite, Courses 2 and 5. Must be followed by Course 14. Seniors; 1 lecture period and 3 2-hour laboratory periods. Credit, 4. Professor Stone and Mr. Smith.

14. Shade-tree Management. — Physiology and pathology of shade-trees, as stated in Course 13. Prerequisite, Course 13.

15. Histological Technique. — This course comprises training in general histological methods, including the use of precision microtomes and various methods of killing, fixing, sectioning, staining and mounting of plant materials. This is a technical course in histology, of value to students intending to become research or teaching botanists. It is recommended for students taking Courses 9 and 10, as an aid to the study of relationship between host and parasite, and is open to those taking Courses 13 and 14, who desire to make their studies in tree structure more comprehensive. Collateral reading and conferences. Prerequisites, Botany 2, 3 and 4. Seniors; 3 or 5 2-hour laboratory and conference periods. Credit, 3 or 5.

Associate Professor Osmun.

16. Histological Technique. — As stated in Course 15. Prerequisite, Course 15.

GENERAL AND AGRICULTURAL CHEMISTRY.

Professors Lindsey, Wellington and Chamberlain, Associate Professor Peters, Associate Professor Anderson, Messrs. Bogue, Serex, Robinson, Miller and Gurley.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the other sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and intending following chemistry as a vocation are prepared for positions as instructors in high schools and colleges in the agricultural experiment stations, the United States Department of Agriculture, as well as in fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take graduate work leading especially to the degree of M.Sc., and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.]

Required Courses.

1A. General Chemistry. — An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds. Text-book, Kahlenberg's "Outlines of Chemistry." This course is for those students who do not present chemistry for entrance, and who begin the subject in college. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor Peters, Messrs. Bogue and Gurley.

1B. Advanced General Chemistry. — A review of the fundamental chemical laws, together with the common acid and base-forming elements and their compounds. Text-book, Kahlenberg's "Outlines of Chemistry." The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate, superphosphate, muriate and sulfate of potash, arsenate of lead, Paris green, Bordeaux mixture, lime-sulfur and emulsions. In addition to these, preparations outlined in Blanchard's "Syn-

thetic Inorganic Chemistry" are made. This course is for students who present chemistry for entrance. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor Anderson, Messrs. Bogue, Gurley, Miller, Robinson and Serex.

2A. General Chemistry. — A continuation of Course 1A. A study of metals and their compounds. The laboratory work is the same as described under 1B.

Associate Professor Peters, Mr. Bogue and Graduate Assistants.

2B. Inorganic Agricultural Chemistry. — A study of the chemical composition, properties and reactions of soils, fertilizers, fungicides and insecticides, and the common materials of construction, such as tile, brick, cements, paints, etc. Text-book, Fraps' "Principles of Agricultural Chemistry." The laboratory work is divided into three parts, as follows: (*a*) qualitative examination of soil, plant ash and superphosphate; (*b*) approximate quantitative determination of moisture, ash, carbonic acid, phosphoric acid, potash, etc.; (*c*) special work on retention of salts by soil, leaching of lime from the soil by carbonated water, etc. Prerequisite, Course 1B. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor Anderson, Mr. Bogue and Graduate Assistants.

Elective Courses.

3. Qualitative Analysis. — *Basic.* — A course in the systematic analysis of metallic salts, presented from the ionic viewpoint. The student studies closely the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Böttger's "Qualitative Analysis" and Treadwell-Hall's "Qualitative Analysis" for reference. Prerequisite, Course 2; should be taken, particularly, by all intending to follow chemistry as a vocation. Sophomores; lecture, 1 hour; laboratory, 4 hours. Credit, 3.

Associate Professor Anderson and Mr. Serex.

4. Qualitative Analysis. — *Acidic.* — A continuation of Course 3. A large part of the semester is spent in the examination qualitatively of minerals and of agricultural products. Prerequisite, Course 3. Sophomores; lecture, 1 hour; laboratory, 4 hours. Credit, 3.

Associate Professor Anderson and Mr. Serex.

5. Organic Chemistry. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those

compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates, proteins, etc. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for future work in agricultural chemical investigation. Prerequisites, Courses 1, 2, 3 and 4 (Course 3 or 4 will not be required as prerequisites for those majoring in other courses than chemistry). Juniors; those electing Course 5 are expected to elect Course 6. Lectures, 3 hours; laboratory, 4 hours. Credit, 5.

Professor Chamberlain and Mr. Miller.

6. As stated under Course 5.

[Agricultural Chemistry. — The two following courses in general agricultural chemistry are designed especially for students majoring in the different departments of the Divisions of Agriculture and Horticulture, and every effort is made to meet the demands of these departments. They are for students in practical agriculture, and not for those intending to take up scientific lines of work. They form an alternative group with either Courses 3 and 4 or 5 and 6.]

7. Inorganic Agricultural Chemistry. — The same as Course 2B. This course is designed for those men who have had only Courses 1A and 2A. Prerequisite, Courses 1A and 2A. Juniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3. Associate Professor Anderson and Mr. Serex.

8. Organic Agricultural Chemistry. — The course embraces the study of the most important groups of organic compounds of plants and animals, the composition of plants, the chemistry of plant growth, plants as food and as industrial material, the composition of animals, the chemistry of digestion, absorption and metabolism, animal nutrition, animal foods, rations, etc., and also the study of some of the products related to plants and animals, such as milk, butter, cheese, sugar, alcohol, wood pulp and paper. The treatment of the subject will be general, avoiding (so far as possible) complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the general chemistry of plants and animals and agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Professor Chamberlain and Mr. Miller.

9. Quantitative Analysis. — Instruction in this course includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals in minerals and industrial products. Aside from teaching accurate observation and care in manipulation, it is intended for those who would learn the exact methods for determining the elements, particularly, in inorganic substances, and is the forerunner of other courses intended to fit men to become expert analysts. Talbot's "Quantitative Chemical Analysis" is used as a text. Prerequisites, Courses 1, 2 and 3 or 4. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor Wellington and Assistant.

10. Agricultural Chemical Analysis. — In this course and Course 11 the methods previously studied, and other approved methods, are applied to the examination of agricultural materials. The analysis of fertilizers, in-

secticides, fungicides and soils is followed by that of cattle foods, dairy products, sugars, starches and allied substances. Prerequisite, Course 9. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON and Assistant.

11. AGRICULTURAL CHEMICAL ANALYSIS. — As stated under Course 10. Prerequisite, Course 10. Seniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5. Associate Professor PETERS and Assistant.

12, 14 and 16. See below, following Course 15.

13. PHYSIOLOGICAL CHEMISTRY. — This course is intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work in microbiology, botany, agronomy, animal husbandry, etc., and who have had Courses 5 and 6, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 5 and 6 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory, experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion. The course gives additional training in the chemical problems of agricultural experiment station work, especially those connected with investigations in animal and plant nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Courses 7 and 8. Prerequisites, preferably, Courses 5 and 6 or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3. Professor CHAMBERLAIN and Mr. MILLER.

15. PHYSICAL CHEMISTRY. — A résumé of general chemistry from the viewpoint of physical chemistry and the application of physical chemistry to agricultural chemistry. Prerequisite, Course 9. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor ANDERSON and Mr. SEREX.

[GENERAL STATEMENT CONCERNING COURSES 12, 14 AND 16. — Each student electing either of these courses will be required to take up and follow out some special line of work, the object being to acquaint him with methods of original inquiry. A single concrete example may be found in a comparative study of the different methods for the determination of the several forms of nitrogen. A thesis may not be required, but frequent consultation of the literature bearing on the subject will be necessary. These courses are valuable for all chemists, and particularly so for those intending to take up experiment station work. A student may choose any one but not two of these separate courses.]

12. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS. — The student is given a problem to solve either in analytical chemistry or related to the agricultural industries. This will acquaint him with the methods used in research and with the literature, and show him how to handle problems in this field of chemistry when occasion arises.

Associate Professor PETERS.

14. Special Work in Physiological and Organic Agricultural Chemistry. — In this course, as in Courses 12 and 16, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, the chemical study of dairy products, etc. Prerequisites, Courses 5, 6 and 13. Seniors; laboratory, 10 hours. Credit, 5.

Professor Chamberlain.

16. Special Work in Physical Chemistry. — The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student will select one line of work and follow it through the course, repeating some of the original work. Prerequisite, Course 15. Laboratory, 10 hours. Credit, 5.

Associate Professor Anderson.

18. History of Chemistry. — An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at greater length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course. Seniors; lectures, 2 hours. Credit, 2.

Professor Wellington.

ENTOMOLOGY.

Professor Fernald, Associate Professor Crampton, Associate Professor Gates, Mr. Regan, Mr. Martin, ————.

Elective Courses.

1. General and Economic Entomology. — Course 1 comprises a general introduction to the study of insects, including studies on their structure as applied to their identification; the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collections, and methods for their control. The most important insecticides and their preparation and application are also treated. Students electing Course 1 are expected to take Course 2. Juniors; 3 lecture periods. Credit, 3. Professor Fernald.

2. General and Economic Entomology. — A continuation of Course 1, with laboratory and field work on methods of collecting, preserving and studying insects and their work. Juniors; 2 laboratory or field periods. Credit, 2. Professor Fernald.

3. Advanced Entomology. — This course is subdivided, the time spent on the various subdivisions differing somewhat according to the particular

needs of those taking it; and it is to a large degree given in the form of individual instruction, special attention being paid to the pests attacking the particular crops in which the student is most interested. The student may specialize in fruit pests, market-garden pests, greenhouse pests, field crop pests, etc., to a large extent, in accordance with his plans for future work.

A. Morphology. — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. Histology. — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

C. Insecticides and Apparatus. — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects; tests for detecting adulterations; comparative tests of nozzles and other apparatus; and a study of other methods of insect control, together with laboratory work.

D. Coccidology. — Lectures and laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

E. Bibliography. — Studies of the various entomological publications and of the methods of finding the literature on any insect.

F. Special Studies. — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing Course 3 are expected to take Course 4; 1 1-hour lecture period and 3 2-hour laboratory or field periods. Credit, 4.

Professor Fernald, Associate Professor Crampton, Mr. Martin.

4. Advanced Entomology. — As stated in Course 3. Prerequisite, Course 3.

5. Forest and Shade-tree Insects. — A study of the insects injurious to forest and shade trees, and of methods for their control, with laboratory and field work on these insects, and a study of what has been published about them. Seniors; prerequisites, Entomology 1 and 2; 1 lecture and 2 2-hour laboratory or field exercises. Credit, 3. Professor Fernald.

8. Beekeeping. — This course comprises a general consideration of the biology of the honey bee and the elements of practical beekeeping. Some topics covered are: life history, general behavior and instincts, structure, products, relations of bees to plants, the honey flora. The course aims particularly to afford first-hand, practical experience with bees, to the end of enabling their proper maintenance for any purpose, horticultural, educational

or apicultural. Bee diseases, a thorough understanding of which is fundamental, are emphasized. So far as possible the work is made individual in constructing materials and apparatus and in the manipulation of bees. Juniors; seniors may elect. Courses 1 and 2 form a desirable preparation; 2 lectures, 1 2-hour laboratory period. Credit, 3.

Associate Professor GATES and Mr. ——.

10. ADVANCED BEEKEEPING. — This course deals with the advanced and special problems of the beekeeper. Besides considering those difficulties which at present confront the industry, subjects necessarily of limited treatment in the previous course are expanded for the development of particular technique and manipulation. Apiary management, including the principles of queen rearing, are practiced. The course should further qualify for apicultural instruction and inspection service, affording familiarity with the special literature and methods needed in investigation and research. The policy of individual instruction is continued in so far as practicable. Primarily for seniors, but juniors may elect; prerequisite, Course 8; 1 lecture, 1 2-hour laboratory period. Credit, 2.

Associate Professor GATES and Mr. ——.

11. EVOLUTION. — In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the appearance of man; his future in the light of his past development; and the evolution of human institutions and ideas. Consideration is also given to the theories concerning the factors of evolution, the general problems of heredity and similar topics. The course closes with a brief discussion of the philosophical, moral and social aspects of the problems involved, and the influence of the idea of evolution upon modern thought. The lectures are supplemented by collateral reading; and a portion of the time is used for the purpose of demonstration, or discussion by the class. Seniors; juniors may elect. Two lecture periods. Credit, 2. Associate Professor CRAMPTON.

MATHEMATICS AND CIVIL ENGINEERING.

Professor OSTRANDER, Assistant Professor DUNCAN, Assistant Professor MACHMER, Mr. HAZELTINE.

Required Courses.

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra." Freshmen; 3 hours a week. Credit, 3.

Assistant Professor DUNCAN, Assistant Professor MACHMER, Mr. HAZELTINE.

2. Higher Algebra. — As stated under Course 1.

Assistant Professor Machmer.

3. Solid Geometry. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours a week. Credit, 2.

Assistant Professor Duncan, Assistant Professor Machmer, Mr. Hazeltine

4. Plane Trigonometry (in charge of Department of Physics). — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Freshmen; 3 hours. Credit, 3. Professor Hasbrouck and Assistant Professor Robbins.

Elective Courses.

5. Mensuration and Computation. — The course includes a review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule. Also the graph, mensuration of plane and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of woodworking; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements. Primarily for juniors; 3 hours. Credit, 3.

Assistant Professor Machmer.

6. Plane Surveying. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.

Professor Ostrander, Assistant Professor Duncan, Mr. Hazeltine.

7. Analytic Geometry. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2, 3 and 4. Primarily for juniors; 3 hours a week. Credit, 3.

Professor Ostrander.

8. Differential and Integral Calculus. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 3, 4 and 7. Primarily for juniors; 5 hours. Credit, 5. Assistant Professor Duncan.

10. Roads and Railroads. — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures; 6 hours. [Not given in 1914–15.] Credit, 5.
Professor Ostrander.

11. Hydraulics and Sanitary Engineering. — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures; 3 hours. [Not given in 1914–15.] Credit, 3. Professor Ostrander.

12. Elementary Structures. — An elementary course in roofs and bridges. Text-book and lectures; 6 hours. Credit, 5.
Professor Ostrander.

13. Materials of Construction, Foundations and Masonry Construction. — Text-book and lectures; 4 hours. Credit, 3.
Professor Ostrander.

15. Applied Mechanics. — A course in applied mechanics, based on the calculus, with problems. Text-books and lectures. Prerequisite, Mathematics 8; 3 hours. Credit, 3. Professor Ostrander.

MICROBIOLOGY.

Professor Marshall, Associate Professor van Suchtelen, Mr. Itano, [Mr. Davies], Mr. Avery.

[Courses 1 and 3 (= 2 and 4) are especially adapted to those who wish a general, comprehensive, although elementary, survey of agricultural microbiology.]

Elective Courses.

1. Morphological, Cultural and Physiological Microbiology. — Types of micro-organisms, technic of handling, methods of culture and functions of micro-organisms are considered. This course is elementary and fundamental to all applied and special microbiological studies, and therefore is made a prerequisite to all courses offered; 2 hours or 2 credits are assigned to lectures, text-book requirements and recitations; this time will be scheduled. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled, the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 5. The Department.

2. As stated under Course 1, which it repeats.

3. Agricultural Microbiology. — This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices. These subjects will be demonstrated by illustrative and typical laboratory exercises, which for each subject, on account of time limitations, must be very elementary and greatly restricted. Prerequisite, Microbiology 1 or 2. Two hours or 2 credits are assigned to lectures, text-

book requirements and recitations; this time will be scheduled. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 5. The Department.

4. As stated under Course 3.

5. Advanced Morphological, Cultural and Physiological Microbiology. — The purpose of this course is to prepare the student for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technic and methods of culture, together with a more extensive knowledge of micro-organisms and their functions. Prerequisites, Microbiology 1 or 2, 3 or 4; Chemistry 5 and 6. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors in the fall and spring semesters. Credit, 3.
The Department.

6. As stated under Course 5.

7. Advanced Agricultural Microbiology. — A knowledge of the subjects mentioned in Courses 3 and 4 cannot be obtained without a more extensive training in microbiological practices, as found in Courses 5 and 6. Prerequisites, Microbiology 1 or 2, 3 or 4, and 5 or 6; Chemistry 5 and 6. Six hours or 3 credits are assigned to the laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors in the fall and spring semesters. Credit, 3.
The Department.

8. As stated under Course 7.

9. Soil Microbiology. — Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention. Prerequisite, Microbiology 1 or 2. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 3.
The Department.

10. As stated under Course 9.

11. Dairy Microbiology. — Special emphasis will be placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk; bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered. Prerequisite, Micro-

biology 1 or 2, and Dairying 1 (see Dairying 3). Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 3. The Department.

12. As stated under Course 11.

13. Food Microbiology. — A study of food preservation by means of drying, canning, refrigerating and addition of chemicals will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased foods, will receive consideration. Contamination of food supplies by means of water, handling, exposure, diseased persons, etc., is of especial significance and will be demonstrated by laboratory exercises. Prerequisite, Microbiology 1 or 2. Six hours or 3 credits are assigned to laboratory exercises; only 1 of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 3. The Department.

14. As stated under Course 13.

15. Hygienic Microbiology. — An attempt will be made to select for this course certain material which should be the possession of every individual, and which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antisepsis and asepsis will be treated. Prerequisite, Microbiology 1 or 2. Six hours or 3 credits are assigned to laboratory exercises; only 1 of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 3.
The Department.

16. As stated under Course 15.

PHYSICS.

Professor Hasbrouck, Assistant Professor Robbins.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

Required Course.

1. General Physics. — General physics covers mechanics of solids, mechanics of fluids, wave motion and heat. These topics are chosen for the required work because they are regarded as the most fundamental of all, and there is no part of the work in physics more necessary for the student who plans to take up practical farming. Course given by text-book and lectures. Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5. Professor Hasbrouck and Assistant Professor Robbins.

Elective Courses.

2. General Physics. — Electricity and light. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3. Assistant Professor Robbins.

3. Electricity, Heat and Light. — Three-hour lecture and laboratory course open to juniors and seniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Assistant Professor Robbins.

4. Continuation of Course 3, open to juniors and seniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Assistant Professor Robbins.

[Mathematics 4 (trigonometry) is, for convenience of grouping, listed under mathematics, although in charge of the Department of Physics.]

VETERINARY SCIENCE.

Professor Paige, Associate Professor Gage.

[The courses in veterinary science have been arranged to meet the needs of students who propose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

1. Veterinary Hygiene and Stable Sanitation. — This course is intended to familiarize the student with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals. Juniors and seniors; 3 hours. Credit, 3. Professor Paige.

2. General Veterinary Pathology, Materia Medica and Therapeutics. — In this course such fundamental and general pathological conditions are studied as inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in the diagnosis, prevention and treatment of disease. The course in pathology is followed by one in materia medica and therapeutics, dealing with the origin, preparation, pharmacology, pharmacy, administration and therapeutic use of the more common drugs. Poisonous plants and symptoms and treatment of plant poisoning are also considered. Juniors and seniors; 3 hours. Credit, 3. Professor Paige.

3. Comparative (Veterinary) Anatomy. — The anatomy of the horse is studied in detail, and that of other farm animals compared with it where differences exist. This course is essential for those students wishing to elect Course 4. Juniors and seniors; 3 hours. Credit, 3. Professor Paige.

4. Theory and Practice of Veterinary Medicine; General, Special and Operative Surgery. — A course intended to familiarize the student with the various medical and surgical diseases of the different species of farm animals. Particular attention is given to diagnosis and first-aid treatment. The student is taught the technic of simple surgical operations that can with safety be performed by the stock owner. This course should be preceded by Course 3, and taken in conjunction with Course 2. Lectures, demonstrations and practice. Juniors and seniors; 3 hours. Credit, 3.

Professor Paige.

5. Essentials of General Pathology. — This course is planned to introduce the student to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis will be considered in the laboratory. The various chemical and biological reactions and tests will be presented from the standpoint of pure science, showing applications of chemistry and biology. The course will serve to liberally educate and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

6. Essentials of General Animal Pathology. — This is a continuation of Course 5, and is devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease will be considered. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

7. Avian Pathology. — A course in poultry diseases. The object of this course is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. The work will consist of a systematic study of the diseases of the alimentary tract, liver and abdominal region, followed by a study of the diseases of the respiratory system, circulation and kidneys. The important disease-producing external and internal parasites will be considered; also diseases of the skin and reproductive organs. Lectures and demonstrations. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

8. Avian Pathology. — A continuation of Course 7, devoted to the study of some of the special diseases of poultry. Recent methods used in the control of these diseases will be considered, and opportunity offered the student for demonstrating various disease processes by means of prepared slides. Lectures, demonstrations and laboratory work. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

ZOÖLOGY AND GEOLOGY.

Associate Professor Gordon, Mr. Blanchard.

Zoölogy.

Required Course.

1. Elementary Zoölogy. — This course presents the underlying principles of biology and the zoölogical part of an introductory course. Laboratory dissection and lectures. Sophomores; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3.

Associate Professor Gordon and Mr. Blanchard.

Elective Courses.

3. Invertebrate or Vertebrate Zoölogy. — These are separate courses running throughout the year. The student may elect one or the other, but not both in the same year. The course in invertebrate zoölogy is designed primarily for students who are planning to take up entomology, but is open to any one. The course in vertebrate zoölogy deals with comparative vertebrate anatomy and physiology and is designed for those who desire or require a knowledge of the comparative anatomy and physiology of vertebrated animals. Each course includes laboratory, text-book and lecture work. These courses are scheduled in the junior year, but are open to seniors; hours by arrangement. Credit, 3. Associate Professor Gordon.

4. Invertebrate or Vertebrate Zoölogy. — The continuation and completion of Course 3 of the first semester; hours by arrangement. Credit, 3. Associate Professor Gordon.

5. Elements of Histology. — This course gives the theories and methods of preparing normal animal tissues for microscopic examination. Chiefly laboratory work, with reading and occasional seminars. Open to juniors and seniors. Hours by arrangement; see below, Course 6. Credit, 2. Mr. Blanchard or Associate Professor Gordon.

6. Elements of Histology. — In Course 6 the student may carry forward the work of the first semester, thereby completing a year's work, or may take the work outlined for Course 5. Open to juniors and seniors. Hours by arrangement. Credit, 2. Mr. Blanchard or Associate Professor Gordon.

7. Advanced Zoölogy.[1] — Special elective work in advanced zoölogy is offered to seniors who are interested in zoölogy or who are looking forward to advanced work in any department of zoölogy or allied branches; hours by arrangement. Credit, 5. Associate Professor Gordon and Mr. Blanchard.

8. Advanced Zoölogy.[1] — This course may be a continuation of the work of the first semester or of separate character; hours by arrangement. Credit, 3. Associate Professor Gordon and Mr. Blanchard.

Geology.

Elective Course.

2. Elementary Geology. — Rock-forming minerals; rock types; rock weathering; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 1-hour period and 2 2-hour periods. Credit, 3. Associate Professor Gordon and Mr. Blanchard.

[1] The work offered in Courses 3, 4, 7 and 8 may apply on a minor for the degrees of master of science or doctor of philosophy.

DIVISION OF THE HUMANITIES.

Professor SPRAGUE.

ECONOMICS AND SOCIOLOGY.

Professor SPRAGUE.

[The courses in Economics and Sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.]

Elective Courses.

1. POLITICAL ECONOMY. — An introductory course which takes up the study of the nature and scope of economics, the evolution and organization of the present economic system, and the fundamental principles of production, exchange and consumption. The class will study and discuss such topics as wealth, value, capital, interest, profits, wages and labor, tariffs, trusts, etc. Debates on current economic problems will be organized in the class. Text-book, library readings, lectures and discussions. Arranged primarily for juniors; open to seniors; 3 hours. Credit, 3. Professor SPRAGUE.

2. INDUSTRIAL PROBLEMS. — This is a course in the most important industrial problems of the day, covering the methods of organizations of labor and capital, systems of industrial remuneration, means of securing industrial peace, legal status of labor unions and their activities, protective legislation for workmen and employers, the problems of immigration, the sweated industries, prison labor, child labor and industrial education. Text-book, with collateral readings, lectures and discussions; 3 hours. Credit, 3.

Professor SPRAGUE.

4. ANTHROPOLOGY; THE HISTORY OF HUMAN CIVILIZATION. — The evolutionary origin and history of man; characteristics of primitive men, departure from the animal status, and the beginnings of civilization; development of industries, arts and sciences; the growth of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern conditions; characteristics of the leading races of the world. These topics will constitute the subject-matter of the course. Arranged for sophomores and juniors. Library readings, text-book and lectures; 3 hours. Credit, 3. Professor SPRAGUE.

5. PUBLIC FINANCE, MONEY AND BANKING. — This course follows Economics 1. It will take up taxation and the various systems for collecting public revenue in Europe and America, with the problems involved; the history of money and the systems of banking and finance now in operation; the cause and problems of economic crises and depressions; the currency problems of the United States. For juniors and seniors. Readings, lectures and discussions; 3 hours. Credit, 3. Professor SPRAGUE.

7. SOCIAL INSTITUTIONS AND SOCIAL PROBLEMS. — This course is devoted to the study of the social institutions, such as the family, the church, State and property; and to such current social problems as divorce, race suicide,

crime and prison reform, poverty and its relief. Considerable time is given to the study of eugenics in its social significance and possibilities. The correctional and charitable institutions of Massachusetts are studied in some detail. The later weeks of the term are devoted to a short introduction to sociological theory. Arranged especially for seniors; open to juniors by permission. Readings, lectures, discussions; 3 hours. Credit, 3.

Professor Sprague.

8. Modern Social Reform Movements. — The history of property and its vital issues in modern times; the socialistic systems, anarchy and communism; systems of workingmen's insurance in Europe and America, and other methods of relief from the chances of life; educational reforms, in process, to meet the demands of a new age, and legislative remedies for the evils of social change and maladjustment; the crisis of Christianity under modern capitalized industrialism. These topics indicate the nature of the subjects studied. This course is arranged to follow Economics 7; 3 hours. Credit, 3.

Professor Sprague.

HISTORY AND GOVERNMENT.

Elective Courses.

1. Elements of Political Science. — Nature and scope of political science; origin and evolution of the State; systems of government in the principal European States; organization and working of the national and of the State governments of the United States; relation of government to political parties and to public opinion; the functions of government as related to labor and commerce. [Withheld in 1914–15.] Three hours. Credit, 3.

2. Local Political Institutions. — A comparative study of the organization, functions and achievements of country and city groups, especially as these are concerned with such matters as taxation, finance, licenses, franchises, public ownership, highways, transportation and communication, water supply, fire protection, public lighting, markets, food inspection, garbage and sewage disposal, infectious diseases, housing conditions, police force, parks and playgrounds, libraries, schools, care of dependents. Three hours. Credit, 3.

3. The History of New England. — In this course, New England is regarded as a unit. Although the history of agriculture and of rural life is treated with special fulness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3. ——————[1]

5. The History of Ideals. — This course treats history from the idealistic rather than from the economic point of view. It attempts to define

[1] Given in 1914 by Miss Jefferson.

the great ideals which have impelled some of the most important social, political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. [Withheld in 1914–15.] Lectures and reading; 3 hours. Credit, 3.

LANGUAGES AND LITERATURE.

Professor Lewis, Associate Professor Neal, Assistant Professor Ashley, Assistant Professor Mackimmie, Assistant Professor Smith, Miss Goessmann, Mr. Harmount, Mr. Julian, Mr. Prince, Mr. Rand.

English.

Required Courses.

1, 2. Freshman English. — Composition; introduction to literature. Recitations, laboratory practice and lectures; theme writing; conferences. Text-book and laboratory manual, Neal's "Thought-building in Composition." Freshmen; 4 hours. Credit, 4.

Associate Professor Neal, Assistant Professor Smith, Mr. Prince, Mr. Rand.

3, 4. Sophomore English. — A general reading course in English literature. Prerequisite, Courses 2 and 3 respectively; sophomores; 2 hours. Credit, 2. Professor Lewis and Miss Goessmann.

Elective Courses in English Language and Literature.

[The elective courses in English fall into two groups. Both groups are intended to increase the student's appreciation of literature as a means to enjoyment, education and spiritual growth. Group one (Courses 11, 12, 13 and 14) will, besides introducing the student to individual writers, emphasize the life and thought of the times, political, economic and social, in order that the student may realize literature as the expression of individual genius representing (by leading it or summarizing it) the thought and spirit of a period or a social unit. Group two (Courses 7, 15 and 16) will tend more to emphasize form-characteristics, artistic quality or historical development of literary types, or individual great writers. Courses 7, 12, 13A, 14A, 15A and 16 are offered in 1914–15 and 1916–17; courses 11A, 12, 13B, 14B, 15B and 16 are offered in 1915–16 and 1917–18.]

7. Advanced Composition. — A. *Working Principles of Writing* (fall of 1914, 1916). — A course introducing the student to the more advanced aspects of general composition. It deals with diction, fundamental processes of phrasing, sentence-structure, the gathering of materials and the organization of thought, and the forms of discourse. In treating the forms of discourse, a good deal of attention may be paid to narration (for argumentation, see Debating). The course is recommended to students who wish to increase either their facility in written expression or their appreciation of language as a means of intellectual and artistic expression. For juniors and seniors; every second year; 3 hours. Credit, 3. Mr. Prince.

B. [Withheld.]

8. [Withheld.]

11. English Writers and Thought. — A. *From Milton to Pope* (fall of 1915, 1917). — A survey course. It begins with a brief review of the Elizabethan period, and then considers the period of Milton (Caroline literature — Puritanism, the civil wars, Cromwell and the Protectorate), followed by the rapidly changing political and social conditions of the Restoration and then of the Revolution, ending with the Augustan age and Pope, and the temporary predominance of classicism and the intellectual instead of emotional qualities in literature. It will, however, emphasize the leading writers of the periods, including Bacon, Milton, Dryden, Addison and the essayists, Swift and Pope. Much of the literature of these times is closely associated with interesting and most important events in English political, religious and social history that introduce and explain the later modern periods. Juniors and seniors; every second year; 3 hours. Credit, 3.

Assistant Professor Smith.

B. [Withheld.]

12. American Writers and Thought. — Intended to give a general survey of literature in America, especially in the nineteenth century, with an introduction to the work of the best-known writers, and with especial attention to the relations between national life and history and national thought as expressed in literature. The usual authors — Irving, Cooper, Bryant, Poe, Longfellow, Emerson, Hawthorne, Whittier, Parkman, Lowell, Holmes, Whitman, Lanier — will be discussed, and attention will be given to southern and western authors. Present writers and tendencies will also receive some notice. Juniors and seniors; every year; 3 hours. Credit, 3.

Mr. Prince.

13. English Writers and Thought. — A. *Verse from 1744 to 1832* (fall of 1914, 1916). — A course in history, appreciation and understanding. Between the years named we see the rapid decline in formalism and a rapid increase of originality, freedom and emotional quality in literature (romanticism), accompanying the appearance in England of liberalism, industrial development, more general education and the spread of the ideals of democracy, and influenced also by Continental thought, especially the spirit of the French Revolution. This is the time in which England entered definitely upon that period of modern struggle, change and reorganization which is to be seen still continuing in contemporary affairs. Some of the writers belonging to it are Thomson, Collins, Gray and Cowper, Goldsmith, Chatterton, Blake, Crabbe, Burns, Coleridge, Wordsworth, Keats, Shelley, Scott and Byron. Juniors and seniors; alternates with Course B; 3 hours. Credit, 3.

Assistant Professor Smith.

B. *Prose from 1744 to 1832* (fall of 1915, 1917). — A course in English prose paralleling Course A, which see. Some of the writers belonging to the period are Johnson, Sterne, Goldsmith, Burke, Miss Burney, Coleridge, Landor, Lamb, De Quincey and Hazlitt. The political essayists and the reviews will receive attention, but prose writers whose principal work was done in the novel will not be emphasized (see Course 15). Juniors and seniors; alternates with Course A; 3 hours. Credit, 3.

Assistant Professor Smith.

14. English Writers and Thought. — A. *Nineteenth Century Verse* (spring of 1915, 1917). — In general conception this course is like Course 13, which see. It begins with literature under the economic and social conditions of Victorian England, involving the advance of democracy, the spread of knowledge and culture, the advance of science, and the increase of industrialism, accompanied somewhat by materialism. The literature of the period takes new forms and directions; among its characteristics is an earnest endeavor to interpret ideals to a vastly increased and incompletely prepared reading public ("social service"). Tennyson, Browning, Mrs. Browning, Arnold, the Rossettis and Morris, Swinburne and Clough are among its noteworthy authors. Contemporary verse-writers will receive some notice. Juniors and seniors; alternates with Course B; 3 hours. Credit, 3.

Professor Lewis.

B. *Nineteenth Century Prose* (spring of 1916, 1918). — This course parallels Course A, which see. Among the writers discussed will be Macaulay, Carlyle, Ruskin, Newman, historians (*e.g.*, Froude) and essayists (*e.g.*, Pater, Arnold and Symonds). Fiction writers are given little attention (see Course 15), but contemporary writers of other prose will be given some notice. Juniors and seniors; alternates with Course A; 3 hours. Credit, 3.

Professor Lewis.

15. Prose Fiction. — A. *The Novel* (fall of 1914, 1916). — The historical development, the technique and the leading types of English novelistic fiction; showing the gradual emergence of specialized forms, the recognition of particular ends that can be served by fiction, and the consequent determination of distinct methods of treatment and classes of material adapted to these ends; and the reading, discussion and criticism of significant works and authors. Among the results that may follow the study of the novel are: (*a*) a sense of critical method, springing from the consideration of historical development and of types; (*b*) a deepened humanism, consequent on the study of acts and motives of men and the influences that modify them; (*c*) increased appreciation of artistic method and form; and (*d*) acquaintance with a kind of literature that has grown into great importance through the popularizing of science, the downward extension of learning, and the democratizing of society. Juniors and seniors; alternates with Course B; 3 hours. Credit, 3.

Associate Professor Neal.

B. *The Short Story* (fall of 1915, 1917). — In this course historical development will be more cursorily treated than in Course A, and emphasis will be placed largely upon the characteristics that are primarily of esthetic and cultural effect — structure, artistry, literary quality, finish, emotional quality, dramatic power. Stories may be read, in translation, from other literatures as well as from English, and students will be encouraged to read freely, although critically, of contemporary work. The course is not one in short-story writing, but students interested in this phase of the subject will be assisted as far as possible. General texts, Neal's "Short Stories in the Making" and "To-day's Short Stories Analyzed." Particular results that may be obtained from short-story study are: (*a*) self-culture, the short story being well adapted to stimulate the literary, dramatic and imaginative faculties;

and (*b*) acquaintance with that type in which American literature has especially succeeded. Juniors and seniors; alternates with Course A; 3 hours. Credit, 3. Associate Professor Neal.

16. The Drama and Shakspere. — The source, technique and development of drama, accompanied by a study of Shakspere, his mind, manner and technique. The minor Elizabethan dramatists, their influence on Shakspere, and Shakspere's influence on later writers, will be considered, as will the English social and industrial conditions of the time, their causes and their influence on Shakspere and his fellow writers. Extensive reading, analysis and interpretation of his comedies, tragedies and histories, and of other works, is included. Juniors and seniors; every year; 3 hours. Credit, 3.

Assistant Professor Smith.

Journalism.

[The courses in journalism emphasize rural journalism. They aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant the application of journalistic principles in getting and suitably presenting material adapted to the non-urban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. As practical work, members of the classes have for two years supplied "The Bay State Ruralist," a feature page for the "Springfield Sunday Union." Members of all classes may be required to turn in copy regularly for such disposition as the instructor may determine, and must have free time for covering stories.]

Elective Courses.

1. Introduction to Journalism. — The foundation conceptions and aims of journalism; practice in the simple forms of journalistic writing. Prerequisite to all other work in journalism, and valuable also to students preparing for practical farming, agricultural or general science, rural education, etc., as a vocation. Two hours, with a third hour at option of the instructor. Credit, 2. Associate Professor Neal.

2. News-gathering and News-writing. — This includes the gathering and presentation of industrial and agricultural information, campus news or other stories, as may be directed. Courses 1 and 2 are the foundation courses in journalism. Students admitted to 2 who have not had 1 may be required to do supplementary work. Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor Neal.

3, 4. Journalistic Practice. — The gathering and preparation of material for publication. Prerequisite, Course 1 or 2. At present this course is given only on application, which should when possible be made early in the first year of study. Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor Neal.

5, 6. Advanced Journalistic Practice. — Given only on application. Students may be assigned work as editorial assistants or writers, or otherwise employed in some form of journalistic activity, or directed to the study of particular forms of journalistic writing, of special subjects and their journalistic

presentation, of particular kinds of periodical, or of current topics. The presentation of a thesis may be required. Hours to be arranged. Two hours. Credit, 1. Associate Professor Neal.

Public Speaking.

Required Courses.

1, 2. Freshman Public Speaking. — Freshman public speaking is required in either the first or the second semester at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Some attention is given to breath control and development of speaking voice, considerable attention to pronunciation and enunciation, and a large amount of attention to the preparation and delivery of extempore speeches. Text-book, Shurter's "Extempore Speaking," supplemented by lectures and discussions. Freshmen; in semester 1 or 2 as directed; 1 hour. Credit, 1.

Mr. Prince, Mr. Rand.

Elective Courses.

7. Debating. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the intercollegiate debates. Prerequisite, Course 3; 2 hours. Credit, 2.

Assistant Professor Smith.

8. Occasional Oratory. — Exercises for voice and gesture; a study of the elements of vocal expression and action; speeches on assigned topics; prescribed reading; the preparation and delivery of a formal oration or two. It is especially recommended for those who desire to enter the Flint contest. Two hours. Credit, 2. Assistant Professor Smith.

FRENCH AND SPANISH.

Assistant Professor Mackimmie, Mr. Harmount.

French.

Required Courses.

1, 2. Elementary French. — The essentials of grammar are rapidly taught, and will be followed by as much reading as is possible. This course is required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen, 4 hours. Credit, 4. Mr. Harmount.

3. Intermediate French (third year). — Training for rapid reading; the reading of a number of short stories, novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor Mackimmie, Mr. Harmount.

4. Intermediate French. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3.
Assistant Professor Mackimmie.

5. Advanced French (fourth year). — A reading course; Balzac's "Eugenie Grandet" and "Le Père Goriot" and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.
Assistant Professor Mackimmie, Mr. Harmount.

Elective Courses.

6. Advanced French (fourth year). — A general view of the history of French literature; Kastner and Atkins' "History of French Literature." Several plays of the great classical dramatists will be read. Individual conferences on outside reading selected by the student. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

7, 8. Scientific French. — This course is planned to meet the requirements of the individual student and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read. Three hours. Credit, 3. Mr. Harmount.

9, 10. Modern French Literature. — The outline is intended as a suggestion. The exact subject matter of the course will be determined when the men are enrolled. The object of this course is to give an introduction to recent movements in French literature. In the drama, readings from Augier, A. Dumas, fils, Delavigne; in the novel, from Flaubert, the de Goncourts, Zola; in criticism, from Taine, Renan, Sainte-Beuve; for the literary history of the period Lanson's "Histoire de la Litterature Française." Prerequisite, the required French. Juniors or seniors; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

Spanish.

Elective Courses.

1, 2. Elementary Spanish. — Grammar, with special drill in pronunciation; exercises in conversation and composition. Reading from a reader and selected short stories. Intended primarily for juniors. Open to other students upon arrangement. Both semesters; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

3, 4. Modern Spanish Authors. — Reading from modern Spanish novel and drama. Translation of English into Spanish. Private reading. Prerequisites, Courses 1 and 2. Intended primarily for seniors; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

GERMAN AND MUSIC.

Assistant Professor Ashley, Mr. Julian.

German.

Required Courses.

1. Elementary German. — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering in German, and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German. Arranged for freshmen; open by permission to other students; 4 hours. Credit, 4. Mr. Julian.

2. Elementary German. — As stated under Course 1. Prerequisite, Course 1.

3. Intermediate German. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Assistant Professor Ashley.

3A. Intermediate German. — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. Julian.

4. Intermediate German. — As stated under Course 3. Prerequisite, Course 3.

4A. Intermediate German. — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3.

5. Advanced German. — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor Ashley.

Elective Courses.

6. Advanced German. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Assistant Professor Ashley.

7. Scientific German. — Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students. Open to juniors who have completed Course 4A or more advanced work. Three hours. Credit, 3.
Assistant Professor Ashley.

8. Scientific German. — As stated under Course 7.

9. Conversation and Composition. — Translating connected English into German. Reproducing outside readings in German orally in class; 1 hour. Credit, 1. Assistant Professor Ashley.

10. Modern German. — As stated under Course 9.

11. German Literature. — Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust," and one modern typical drama. Prerequisite, Course 6 or 10; 3 hours. Credit, 3. Assistant Professor Ashley.

12. German Literature. — As stated under Course 11.

Music.

Elective Courses.

1. History and Interpretation of Music. — History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Assistant Professor Ashley.

2. History and Interpretation of Music. — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1.
Assistant Professor Ashley.

DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

AGRICULTURAL ECONOMICS.

Associate Professor Cance, Mr. Strand.

Required Course.

2. Agricultural Industry and Resources. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Associate Professor Cance and Mr. Strand.

Elective Courses.

3. Elements of Agricultural Economics. — This course is designed to follow the required work in the elements of economics. It deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; determination of price; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Associate Professor Cance.

5. Historical and Comparative Agriculture. — Recommended to students in journalism or education. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Seniors and juniors; open to other students upon arrangement; prerequisite, Course 3 or equivalent; 3 hours. Credit, 3.

Associate Professor Cance.

6. Co-operation in Agriculture. — The course treats of the history, principles and business relations of agricultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements; (2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States;

(3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, with particular reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises; 3 hours. Credit, 3.

Associate Professor CANCE.

7. THE AGRICULTURAL MARKET. — A study of the forces and conditions which determine the prices of farm products, and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, transportation by freight, express and trolley, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market, direct sales and the like are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work. Juniors and seniors; 3 hours. Credit, 3.

Associate Professor CANCE.

8. PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the economic problems affecting the farmer. Some of these are: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems, — cost of producing farm products, farm labor in New England, immigration, shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors and juniors; open upon approval to other students; 2 or 3 hours. Credit, 2 or 3.

Associate Professor CANCE.

9. SEMINAR. — Research in agricultural economics and history: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1.

Associate Professor CANCE.

10. SEMINAR. — As stated in Course 9.

AGRICULTURAL EDUCATION.

Professor HART.

Elective Courses.

1. RURAL SCHOOL PROBLEMS. — Primarily for teachers. A study of agricultural education; the theory and practice of teaching; rural school organization; methods of instruction; the place and function of agriculture in the course of study for both rural and city schools; planning and practical work in school and home gardens; planning of equipment and ornamentation of rural school grounds. One lecture period, and 2 2-hour laboratory periods. Credit, 3.

Professor HART.

2. As stated under Course 1.

3. Meaning of Education (Psychology). — For teachers and others desiring an introduction to mental science. A study of the development, structure and functions of the nervous system and the sense organs; the development and nature of mental activities; the nature of the learning processes. Three lecture periods. Credit, 3. Professor Hart.

4. History and Philosophy of Education. — For teachers and others desiring an introduction to educational theories. A study of educational ideals and movements as exemplified by leading nations and races; the growth of educational institutions as influenced by science and industry; the history and meaning of industrial and agricultural education. Three lecture periods. Credit, 3. Professor Hart.

5. Problems in Rural Education. — For teachers or others interested in special phases of education, such as child development, physical and mental; school organization; rural schools; secondary schools; school programs; grading and promotion of pupils; school grounds and school architecture and equipment; normal schools and the preparation of teachers; agricultural teaching and agricultural schools. Two lecture periods. Credit, 2. Professor Hart.

6. As stated under Course 5.

7. Graduate Courses. — See Graduate School.

RURAL SOCIOLOGY.

President Butterfield, Professor Hart, Miss Goessmann, Mr. Lund, Mr. Baird.

Elective Courses.

1. The Rural Community. — A broad survey of the field of rural sociology, including such topics as the movements of the rural population, the social conditions and life of rural people, the influence of rural life, the description of the various social institutions of the rural community, an analysis of the fundamental problems of rural life, and the means of developing and redirecting the life of the rural community. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3. President Butterfield and Mr. Lund.

2. Rural Institutions. — A study of the organized agencies by which rural communities carry on their various forms of associated life; particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment. Special attention given to the rural family and the rural church. Three hours. Credit, 3. Mr. Lund.

3. The Literature of Rural Life. — A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities. Three hours. Credit, 3. Miss Goessmann.

4. Rural Law. — The work of this course will cover such points as land titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures, and class discussions; 1 hour. Credit, 1.

Professor Hart.

5. The State and the Farmer. — A general survey of political organizations and movements among farmers in foreign countries and their influence in shaping agrarian legislation; the character, extent and results of foreign State aid to the farming class; political movements among farmers in the United States; "Granger" legislation; relation of the Department of Agriculture, State boards of agriculture, agricultural colleges and experiment stations, postal system, railway commissions, highway commissions, public health agencies, etc., to rural welfare. [Not given in 1914–15.] Three hours. Credit, 3.

6. Sociological Aspects of Co-operation among Farmers. — An historical sketch of the origin, extent and success of co-operation among farmers in the various European countries and in the United States; personal qualities and social conditions necessary to successful co-operative endeavor; the various forms of co-operative organization viewed in their industrial, intellectual and moral aspects; the influence of co-operation on the farmer's individualism, conservatism, self-help, thrift, contentment and on agrarian legislation, scientific agriculture and farm labor; the relation of co-operation to neighborhood life, to community pride and loyalty, to further associated effort, to class stability, solidarity and status; the demand of co-operation for a new type of leadership; the relation of co-operation to socialism and the competitive system. Three hours. Credit, 3.

8. The Social Conditions of the Rural People. — Composition of the rural population; nature, extent and causes of diseases and accidents; health agencies of control; extent and causes of delinquency and dependency; conditions of temperance, of sexual morality and family integrity; child labor; woman's work and position; relation of employer to employee; standard of living; size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics. Three hours. Credit, 3.

9. The Social Psychology of Rural Life. — Characteristics of the rural mind; character of hereditary and environmental influences; nature and effects of face-to-face groups; psychological effects of isolation, relative security and freedom from strain; relation of contact with nature, of control over immediate environment, of family co-operation and of neighborhood life to self-control, self-expression, sympathy, service and leadership; nature and effects of fashion, conventionality and custom; character of discussion and public opinion, and their relation to class feeling and organization; relation of individualism, conservatism and homogeneity to crowd phenomena and progressive democracy. Three hours. Credit, 3.

Mr. Baird.

10. Farmers' Organizations. — The history, purposes and achievements of the Grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; the nature, scope, methods and history of local, State and national associations formed about some farm product or special farm interest, *e.g.*, dairying, horticulture, stock breeding, forestry; their influence on "better farming, better business, better living;" their influence in forming a class consciousness and in shaping legislation; need of federation. Three hours. Credit, 3. Mr. Baird.

11. Sociological Aspects of Current Agricultural Questions. — Government conservation policy, roads, railways, trolleys, telephones, postal service, credit facilities, taxation, pure food laws, tenancy and ownership, intensive versus extensive farming, agricultural labor. Three hours. Credit, 3. Mr. Strand.

13. Seminar. ———————

GENERAL DEPARTMENTS.

MILITARY SCIENCE AND TACTICS.

Captain Martin.

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

The required uniform is of khaki, costing about $18. It is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $18 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

Required Courses.

1. Freshman Drill. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

2. Freshman Drill. — As stated under Course 1. Freshmen; second semester after spring recess; 3 hours. Credit, 1.

3. Freshman Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulation." Freshmen; 1 hour. Credit, 1.
Captain Martin.

4. As stated under Course 3.

5. Sophomore Drill. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends their appointment as sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

6. As stated under Course 5; second semester after spring recess.

7. Sophomore Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports; returns, muster-rolls, enlistment and discharge papers, rosters and requisitions, etc.; "Army Regulations;" lectures on military science. Sophomores; 1 hour. Credit, 1. Captain Martin.

8. As stated under Course 7.

9. Junior Drill. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

10. Junior Drill. — As stated under Course 7; second semester after spring recess.

Elective Courses.

11. Senior Drill. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must take the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

12. Senior Drill. — As stated under Course 11; second semester after spring recess.

PHYSICAL EDUCATION AND HYGIENE.

Assistant Professor Hicks, Mr. Gore, Mr. Fitzmaurice.

Hygiene.

Required Course.

1. Hygiene. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1. Assistant Professor Hicks.

Physical Education.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering.]

Required Courses.

1. Elementary Gymnastics. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit (given only for Course 2), 1. Mr. Gore and Mr. Fitzmaurice.

2. Elementary Gymnastics. — As stated under Course 1.

3. Graded Gymnastics. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit (given only for Course 4), 1. Mr. Gore and Mr. Fitzmaurice.

4. Graded Gymnastics. — As stated under Course 3.

5. Gymnastics. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit (given only for Course 6), 1. Mr. Gore and Mr. Fitzmaurice.

6. Gymnastics. — As stated under Course 5.

Elective Courses.

7. Training Course. — History of Physical Education; supervision of indoor and outdoor athletic contests and games; athletic administration. Seniors; 3 hours. Credit, 1. Assistant Professor Hicks.

8. Training Course. — As stated under Course 7.

THE GRADUATE SCHOOL.

The Graduate School.

Kenyon L. Butterfield, A.M., LL.D., President of the College.

Charles E. Marshall, Ph.D., Director of the Graduate School and Professor of Microbiology.

Graduate Staff, 1914–15: Dr. Anderson, Dr. Cance, Dr. Chamberlain, Dr. Fernald, Professor Foord, Professor Graham, Professor Hart, Professor Haskell, Dr. Lindsey, Dr. Marshall, Professor McLean, Professor Nehrling, Professor Osmun, Dr. Paige, Dr. Peters, Professor Sears, Dr. Shaw, Dr. van Suchtelen, Professor Waugh and President Butterfield.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

Admission.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Nature and Methods of Graduate Work.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary to properly equip the individual professionally.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised by the graduate staff and credit granted as are essential to the highest standards of efficiency.

A description of the equipment of the various departments is given under "General Information."

Theses.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

Two copies of each thesis in its final form, ready for the printer, must be submitted to the director of the school before the candidate for the degree may take the required oral examination. One of the said copies, to contain all drawings, is to be retained as an official copy by the said director, and the other by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis. When printed, three copies of each thesis must be deposited with the director of the graduate school and three copies with the department in which the work was carried out.

All theses become the property of the department in which they are prepared.

Final Examinations.

For the degree of master of science or master of agriculture, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degrees of doctor of philosophy or doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

Degrees conferred.

The degree of master of science and master of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half[1] to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours[1] each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary. The thesis may be waived for the degree of master of agriculture.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours[1] each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

[1] All time statements refer to minimum time.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

Courses offered.

Courses available as major subjects for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.
Microbiology.

Courses available as major subjects for the degree of master of science: —

Agriculture.
Agricultural economics.
Agricultural education.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.

Course available as major subject for the degree of master of agriculture: —

Poultry science.

Courses available as minor subjects for the degree of doctor of philosophy: —

Agriculture.
Agricultural economics.
Agricultural education.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Microbiolcgy.
Poultry science.
Rural sociology.
Zoölogy.

Courses available as minor subjects for the degree of master of science: —

Agriculture.
Agricultural economics.
Agricultural education.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Microbiology.
Mathematics and physics.
Poultry science.
Rural sociology.
Veterinary science.
Zoölogy.

General Outline of Courses for Advanced Degrees.

Agricultural Economics (Major Course). — 1. Graduate research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances the method includes facility in investigation, tabulation and interpretation of results.

2. Candidates for the master's degree, or candidates offering a minor in agricultural economics, will be required to pass an examination covering the undergraduate work now offered in agricultural economics, including Course 3, the elements of economics, Course 7, the agricultural market, and

Course 6, co-operation in agriculture; and in addition such definite research work as may be outlined by the department, to consist of original investigations in some particular divisions of the subject of agricultural economics. Courses 6, 7 and 8 are for graduates and undergraduates. Special investigations may be made by electing seminars in agricultural economics.

3. Candidates for the master's degree will be required to write a thesis or a report covering results of a specific line of personal investigation in one or more fields of the subject. Each candidate will also be required to have a working knowledge of the general field of economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, statistics of agriculture and prices, and markets and marketing.

Agricultural Education (Major Course). — Courses are available in agricultural education as major or minor subjects for the degree of master of science, or, as a minor subject, for the degree of doctor of philosophy. Study will be pursued along one or several of the following lines: —

1. Massachusetts school legislation.
2. Origin and growth of primary, secondary and higher education in Massachusetts.
3. The origin and growth of normal schools, industrial schools and agricultural schools.
4. Educational literature, fiction, periodicals and reports.
5. The physical and mental development of the individual.
6. School administration.

Animal Pathology (Minor Course only). — 1. Reviews in anatomy.
2. Reviews in organography and histology.
3. Special lectures and readings in general and special pathology.
4. Laboratory studies in general and special pathology.
5. Pathological technique.
6. Conferences.

Botany (Major Course). — The following subjects in botany may be studied: —

(*a*) Plant physiology.
(*b*) Plant pathology.
(*c*) Ecology.
(*d*) History of botany.

In the graduate course in botany special attention is given to such subjects as plant physiology and pathology, ecology and the history of botany, etc. These subjects are pursued to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and weekly lectures are given, together with occasional seminars, in which various new problems of botanical science are considered. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY (Major Course). — The department is prepared to offer advanced courses in the following branches of chemistry, particularly as applied to agriculture: —

(*a*) Inorganic chemistry.
(*b*) Organic chemistry.
(*c*) Physiological chemistry.
(*d*) Physical chemistry.
(*e*) Analytical chemistry.

Here follows a statement of courses which may be selected by any one properly qualified, and particularly by those who are desirous of doing work for advanced degrees: —

Course A. — Research in industrial problems applied to agriculture.
Associate Professor PETERS.

Course B. — Research in physico-agricultural chemistry. Prerequisite, Course 15 or its equivalent. Associate Professor ANDERSON.

Course C. — Advanced analytical chemistry. Research work in connection with the study of methods of analysis of fertilizers, cattle feeds, dairy products, soils, insecticides and sugars. Recent and original methods will be applied to a study of the composition of agricultural products.
Professor WELLINGTON or Associate Professor PETERS.

Course D. — Advanced organic chemistry. Special topics in advanced organic chemistry will be considered, both by lectures and in the laboratory. These will include such subjects as constitution and properties of carbohydrates, proteins and fats, uric acid and related compounds, and alkaloids; also such purely chemical phenomena as isomerism, tautomerism and optical rotation. The reading will include "The Monographs on Biochemistry," Cohen, Schorlemmer and Lachman. Professor CHAMBERLAIN.

Course E. — Advanced topics in physiological agricultural chemistry will be studied especially in the laboratory, including digestion, metabolism and nutrition, dietetics, feeding rations, enzymatic action and isolation of enzymes. Required reading will be followed in Abderhalden, Lusk, Hammersten, Stiles, Armsby and Euhler. Professor CHAMBERLAIN.

Lectures on Special Topics. — In addition to the research laboratory courses outlined above, lectures on special topics in organic, analytical and physical chemistry will be given by Professors Chamberlain, Peters and Anderson. These will at present be given in alternate years only. Required of all students majoring in chemistry.

Students for the advanced degrees of master of science and doctor of philosophy, who are taking chemistry as a major, must present as prerequisites all undergraduate courses, 1 to 15 or their equivalent. They will be given a special outline of work, and will also be assigned a subject for an original thesis by the professor in charge. At the end of the work there will be a final written and oral examination before the department. All of this must be completed to the satisfaction of the chemical staff, and particularly of the professor

under whom the work is done. Students not working for a degree may take special work along agricultural chemical lines. Information may be obtained by consulting the chemical staff.

Entomology (Major Course). — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology and polyembryony; transformations; histology; phylogeny; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogamy; chemistry of colors; coloration; luminosity; deformities; variation.

(*b*) *Ecology.* — Dimorphism; polymorphism; protective devices; mimicry; psychoses; insect architecture; plant fertilization; insect products; geographical distribution; methods of distribution; migration; geological history; insects and disease; enemies of insects, vegetable and animal; duration of life; experimental entomology.

(*c*) *Economic Entomology.* — Special methods of control; insecticides; special research; insect photography; methods of preparing illustrations; field work and life-history investigations; insect legislation; methods of record keeping.

(*d*) *Systematic Entomology.* — History of entomology; classifications and the principles of classification; nomenclature and its rules; how to find and use literature; preparing indices; number of insects known and in existence; lives of prominent entomologists; methods of collecting, preparing, preserving and shipping; important collections; location of types.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on topics named above and on the different orders of insects, in English, French or German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

Horticulture. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now constitute the college Division of Horticulture, and which are as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This

general work is under the direction of Prof. F. A. Waugh, head of the Division of Horticulture.

Landscape Gardening (Major Course). — Every student before receiving his master's degree with a major in landscape gardening must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. *Theory.* — The principles of esthetics as applied to landscape gardening.

2. *Design.* — The principles of pure design and their application in landscape and garden planning.

3. *Construction.* — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.

4. *Maintenance.* — Methods, organization, cost.

5. *Practice.* — Office work, drafting, estimating, reporting, charges, accounting.

Qualifications. — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

Thesis or Project. — Each student, before receiving the master's degree with a major in landscape gardening, must present a satisfactory thesis or complete project. A thesis will consist of a careful original study of some problem in landscape gardening, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of: —

(*a*) Original surveys, including topography.

(*b*) Block plans, showing original design.

(*c*) A rendered plan or plans of the main features.

(*d*) Detailed working drawings.

(*e*) Estimates of cost.

(*f*) Complete report and letter of transmittal.

Minor Course. — Any student electing a minor in landscape gardening will be directed to take such courses from the regular catalogue list as may seem most suitable for him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

Microbiology (Major Course). — 1. *Reading.* — Readings will be assigned and reports with critical analyses of literature covering the general subject will be required. For this purpose such material will be selected as will be most pertinent to the needs of the student. Lectures will be given from time to time.

2. *Seminar.* — At intervals the immediate laboratory work and studies of the student will be surveyed and the literature bearing thereon will be discussed. The shaping of investigations in accordance with the critical analyses of the specific literature of the problem involved will be the important rôle of the seminar.

3. *Morphological and Cultural Studies.* — Special advanced studies in the cytology, morphology and cultural characters of micro-organisms will be the general theme of this course. The important factors in classifying and grouping organisms call for an intimate knowledge of this particular phase of microbiology. Laboratory technic will receive emphasis.

4. *Physiological Studies.* — The changes produced by micro-organisms and their functionings in general open a very broad field for investigation and systematic study. It is advised that every graduate student in microbiology give much attention to this branch, gaining thereby the greatest comprehensive knowledge of physiological processes, as well as the methods employed in their determinations.

5. Special advanced courses will be offered in those phases of microbiology indicated by the undergraduate courses: —

1. Fermentation microbiology.
2. Soil microbiology.
3. Dairy microbiology.
4. Food microbiology.
5. Hygienic and sanitary microbiology.

It will be assumed that all graduate students of microbiology must be acquainted with the details of all important phases of agricultural microbiology.

Minor Course. — 1. Courses constituting undergraduate major in microbiology, or their equivalent, will be required.

Note. — If the student is familiar with the work of these courses, advanced work will be given in accordance with the graduate major outline.

2. Emphasis will be placed upon that particular phase of microbiology which will be particularly pertinent to the student's major course.

3. Readings will be assigned, and will be reviewed in conferences.

4. Special lectures on selected subjects in microbiology will be given from time to time.

Poultry Science (Major Course for the Degrees of M.S.[1] and M.Agr.). — 1. *Reading.* — This course consists of a review of the entire field of poultry literature, covering books, bulletins and special articles. A working index will be required of each student.

2. *Seminar.* — This course consists of a criticism of the most important experiments carried on at the various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc.; a more detailed study of some of the largest poultry projects in this country.

3. *Anatomy (Gross and Histological), Physiology, Embryology, Pathology and Surgery.* — This course consists of a careful study of the anatomy and physiology of the fowl; also the development of the chick in the shell, not only as an embryological study, but in relation to metabolic processes and heredity. Surgery includes the removal of warts, tumors and similar growths; operating on birds that are crop bound, or have bumble foot or broken legs; also a removal of sexual organs and regrafting the same.

4. *Breeding.* — Longevity, broodiness, size, shape, color of egg, body characteristics, vigor, egg production, etc., are all characters whose relations to heredity are not understood. Breeding projects along these lines are

[1] Original investigations are required of students working for this degree.

a part of this course. The student will also do considerable work in connection with our regular experimental projects.

5. *Feeding.* — This course consists of feeding for color of yolk, feathers, shell, size of egg and chemical variations due to the various feeds; also to determine the relative value of various foods for various purposes.

6. *Brooding.* — This course consists of original work to determine the relation between viability and rate of growth and the following: type of brooder, number of chicks in brood, sanitation, exercise and weather conditions; also a comparison of hen-hatched chicks with those hatched artificially.

7. *Incubation.* — This course includes a study of a large number of perplexing problems of a practical, scientific and mechanical value.

8. *Poultry Diseases.* — This course includes a study of a number of the most important poultry diseases in relation to the rapidity with which they spread and their eradication; also various problems in poultry sanitation.

9. *Thesis.* — This may be either of a scientific or practical nature, or both, and subjects may be chosen from any one of the above courses, except the first and second. (Required of students working for degree of M.S.)

Note. — 1. The postgraduate course includes all undergraduate work, together with practical experience. Without the latter, students will be unable to handle Courses 4, 5 and 6.

2. Practical poultry work will be required without credit.

3. Courses 1 and 2 are designed particularly for minors.

Rural Sociology (Major Course). — The scope and character of the work for the degree of master of science in this department are as follows: —

1. All courses included in the department of rural sociology. They are as follows: —

The Rural Community, Rural Sociology 1.
The Literature of Rural Life, Rural Sociology 3.
Rural Law, Rural Sociology 4.
The Social Conditions of the Rural People, Rural Sociology 8.
Sociological Aspects of Co-operation among Farmers, Rural Sociology 6.
Rural Institutions, Rural Sociology 2.
The State and the Farmer, Rural Sociology 5.
The Social Psychology of Rural Life, Rural Sociology 9.
Farmers' Organizations, Rural Sociology 10.
Sociological Aspects of Current Agricultural Questions, Rural Sociology 11.

2. Special study of the three following groups of subjects as related to rural conditions: —

(*a*) Nature, extent and causes of diseases and accidents; health agencies of control; extent and causes of delinquency, and of dependency and the various agencies of amelioration; child labor; woman's work and position; character and status of farm labor.

(*b*) Standards of living; cultural agencies and ideals; moral relations.

(*c*) Community consciousness and social activities; the character of discussion and of public opinion, and the relation of these to class feeling and organization.

3. Selected group of subjects in the following field: —

Some participation in the organization and direction of rural forces. This practical work will be under the direction of the department and in connection with such organizations as rural churches, the United States Department of Agriculture, and the Extension Service of the college.

The student whose minor is in rural sociology will have his work selected largely with reference to his previous preparation and his major subjects.

Veterinary Science. — Work is available in anatomy, hygiene, veterinary pathology, medicine, surgery, parasitology and other special lines or divisions of the subject.

Zoölogy. — Courses in zoölogy are available as a minor for the degree of master of science, and as a minor for the degree of doctor of philosophy. The nature of the work varies according to circumstances, and may be intensive in a special field, or of a somewhat more general character, depending on the student's previous acquaintance with general zoölogical science.

The time devoted to zoölogy as a minor for either of the above-named degrees may vary from twelve to sixteen hours per week, pursued for a year and a half.

List of Students.

A list of the degrees conferred in the Graduate School, and of the students enrolled, is given in the general lists at the end of the volume.

THE SHORT COURSES

AND

THE EXTENSION SERVICE.

The Short Courses and the Extension Service.

SHORT COURSES.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those who cannot come to the college for the regular academic courses. They furnish the student with instruction in modern, accepted methods, and are made as concentrated and as practical as possible. In the main, the instruction is given by the regular teaching force of the college, the same laboratories and equipment being used as in the regular college work.

The short courses may be grouped as follows: —

A. Winter Schools.
 1. Ten Weeks' Course.
 2. Farmers' Week.
 3. Apple Packing School.
 4. School for Tree Wardens.
 5. Beekeepers' Course and Convention.

B. Summer Schools.
 1. Summer School of Agriculture and Country Life.
 2. School for Rural Social Service.
 3. Conference on Rural Community Planning.
 4. Boys' Agricultural Camps.
 5. Poultry Convention.

C. Miscellaneous Short Courses.
 1. Short Courses for Special Groups (feed dealers, town officials, etc.).
 2. Special Days for Foreigners.
 3. Meetings of Organizations at the College.

Expenses of the Short Courses. — The expense of attending any of the Short Courses is approximately as follows: —

Registration fee (Ten Weeks' Course, Apple Packing School, Summer School),	$5
Furnished rooms in private houses (per week),	$1.50–$3
Board at college dining hall, per week,	$4
Board with private families, per week,	$5–$6

A lunch counter is operated in connection with the college dining hall. Meals may be obtained there *à la carte* at very reasonable prices.

Students in each of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work. The cost in Amherst is about $1.25 for suit and cap.

Requirements for Admission to Short Courses. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic. Practical experience in farm, garden, orchard or greenhouse work is an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age and must furnish satisfactory evidence of good moral character. References are required, and these are investigated before applicants are accepted.

A. Winter Schools, 1915.

1. Outline of the Ten Weeks' Courses (January 5 to March 12, inclusive). — The following courses are to be given: —

1. Soil Fertility. Associate Professor Haskell. Three lectures a week.
2. Field Crops. Assistant Professor McDonald. Two lectures and one two-hour laboratory period a week.
3. Types and Breeds of Live Stock. Instructor to be announced. Three lectures and two two-hour judging periods a week.
4. Live Stock Feeding. Instructor to be announced. Three lectures a week.
5. Live-stock Management. Assistant Professor Quaife. One two-hour laboratory period a week.
6. Animal Breeding. Associate Professor McLean. One lecture and one two-hour laboratory period a week.
7. Dairying. Professor Lockwood, Mr. Coons, and Assistants. Five lectures and two two-hour and two three-hour laboratory periods a week.
8. Dairy Bacteriology. Professor Marshall. Two lectures a week.
9. Animal Diseases and Stable Sanitation. Professor Paige. Two lectures a week.
10. Poultry. Professor Graham and Mr. Payne. Five lectures and one two-hour laboratory period a week.
11. Farm Management and Farm Accounts. Professor Foord. One lecture and one two-hour laboratory period a week.
12. Fruit Growing. Professor Sears. Three lectures and two two-hour laboratory periods a week.
13. Market Gardening. Mr. Tompson.[1] Three lectures and two two-hour laboratory periods a week.
14. Landscape Gardening. Assistant Professor Harrison. Two two-hour laboratory periods a week.
15. Floriculture. Associate Professor Nehrling and Mr. Thurston. Five lectures and one field trip a week.
16. Forestry. Professor Clark. One lecture a week.
17. Botany. Mr. McLaughlin. Two lectures a week.
18. Entomology. Professor Fernald. Three lectures a week.
19. New England Rural Life. One lecture a week.
20. Mechanics. Associate Professor Gunness. One two-hour laboratory period a week.
21. Rural Sanitary Science. Professor Marshall. Two lectures a week.
22. Beekeeping. Associate Professor Gates and Mr. Byard. Two lectures and one laboratory period a week.
23. Rural Improvement. Professor Waugh. Two lectures a week.
24. Marketing and Agricultural Economics. Associate Professor Cance. Three lectures a week.

2. Farmers' Week. — In order to reach those who cannot come to the college for a longer time this very practical course, four days in length, is given each year. The regular college equipment is used, and work of the regular faculty is supplemented by lectures and demonstrations by eminent men.

The work is divided into six sections as follows: —

1. Field Crops and Farm Management.
2. Animal Husbandry and Dairying.
3. Poultry Husbandry.
4. Fruit Growing, Market Gardening, Floriculture, Forestry.
5. Women's Section, Home Economics.
6. Community Organization.

[1] Temporary head of the Department of Market Gardening.

These sections take up the time from early morning until late afternoon. Prominent men are engaged for the evening lectures. Fruit, corn, livestock, dairy and poultry shows, and other exhibits, are among the leading features. No fee is charged. The 1915 Farmers' Week is March 15 to March 19, inclusive.

3. Apple Packing School. — The work of this school, which is conducted by the department of pomology, is of a practical nature, and includes both box and barrel packing. Persons taking the course will become familiar with the various types of packs, and will receive sufficient practice to enable them to do good commercial packing.

4. School for Tree Wardens. — This course is given in co-operation with the State Forester and the Massachusetts Forestry Association, to give tree wardens and city foresters instruction in the planting, care and preservation of trees, forestry practices, spraying, pruning, duties of tree wardens and various phases of civic improvement. The 1915 school will be held March 23 to 26, inclusive. No registration fees are charged.

5. Beekeepers' Course. — In the last few years a complete apiary and equipment has been brought together at the college, under the direction and management of Dr. Burton N. Gates. This equipment furnishes the best of facilities for the teaching of beekeeping and allied subjects. A conference of beekeepers, with extensive exhibits of beekeepers' supplies and apparatus, is held annually at the close of each short course.

The courses offered are: —

1. Practical Phases of Beekeeping. Associate Professor Gates.
2. Crops for Honey Bees. Dr. Brooks.
3. Relation of Bees to the Pollination of Plants. Associate Professor Osmun.
4. Bees and Beekeepers' Supplies. Professor Paige.

The features of the convention are lectures and demonstrations by authorities of national reputation, as well as exhibits of inventors, manufacturers, supply merchants and queen rearers. A special invitation is extended to all beekeepers to display and demonstrate inventions, implements or methods. If table space is desired or special equipment is to be prepared, notice should be sent to Dr. Burton N. Gates, Amherst, Mass. The college provides covered tables for the exhibits.

B. Summer Schools.

1. The Summer School of Agriculture and Country Life. — The Summer School of the Massachusetts Agricultural College will open June 28, 1915, for a term of five weeks. The work of the summer school was designed originally for teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Extended courses are offered for the benefit of such persons.

The formal instruction in the summer school is given in definite courses herein described. From these each student may elect not less than 10 nor more than 15 exercises a week, unless a larger or smaller amount of work is allowed by the supervisor. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises are arranged for one afternoon of each week. These are on topics of interest to all. Excursions are arranged for

every Wednesday afternoon, and more extended excursions for the whole school are planned for every Saturday. These excursions are in charge of an instructor. In the past they have proved a very enjoyable feature of the work. Round-table and special discussions are arranged by various instructors as their courses require.

A course of evening lectures on popular topics relating to the work of the school is a feature of the general program. This lecture course is free to all students.

Early registration is desirable. Registration fee for the summer school is $5, payable at the time application is made. No other tuition is charged. This fee should accompany application blank and should be made payable to the Supervisor of Short Courses or the College Treasurer.

2. The School for Rural Social Service. — The Massachusetts Agricultural College offers a School for Rural Social Service in connection with the usual Summer School of Agriculture and Country Life. The courses offered give instruction, furnish information and direct the attention of those interested more particularly to the rural field, which has as yet received little systematic study when compared with that which has been given city conditions.

The courses offered are intended for clergymen, teachers, librarians, town officers, grange workers and others who devote a considerable portion of their time to problems of community development. Courses 35 to 47, inclusive, are designed for the needs of these persons. All other courses given during this period are also open to those who register. There is a registration fee of $1 for those attending this school.

3. The Conference on Rural Community Planning. — This conference is held as a closing feature of the summer school each year. In it the larger problems of New England community development are taken up. The following organizations co-operate with the college in providing the programs: the Massachusetts Federation of Churches, the State Board of Education, the State Grange, the Free Public Library Commission, the Massachusetts Civic League, the State Board of Health, the County Work of the Y. M. C. A., the New England Home Economics Association and the Bureau of Statistics.

Section meetings of these groups are held each forenoon, a general round-table discussion is held each afternoon, and lectures are delivered each evening by persons prominent in social and educational work. Many small group conferences are also arranged.

Extensive exhibits, showing in a graphic way what organizations and communities are doing along welfare lines, are arranged at the time of the conference.

This is a four-day conference and is scheduled for July 27 to 30, 1915. A full program is published about June 1. There are no registration or other fees.

4. Boys' Agricultural Camps. — During the month of July several camps are arranged in order that boys from rural districts and small towns may receive some instruction in agriculture and clean, wholesome sports, and that they may have impressed upon them their responsibilities as coming members of society. The daily program consists of camp duty, flag raising, agricultural lessons, talks on hygiene and good citizenship, play and recreation, instruction in handicrafts, photography, evening camp fires, and lectures by men prominent in boys' work. A small fee is charged to help defray the cost of board and incidental expenses.

5. Poultry Convention. — In order to give a large number of poultrymen, who cannot come to the college for a long period of time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, and in marketing poultry products, an annual three-day convention is offered. This will be held from July 21 to 23, 1915, inclusive.

The faculty of the 1914 summer schools was as follows: —

Kenyon L. Butterfield, LL.D., President of the College and Head of the Division of Rural Social Science.
William D. Hurd, M.Agr., Director of the Extension Service and Supervisor of Short Courses.
Herbert J. Baker, B.Sc., Extension Instructor in Farm Management.
John L. Byard, Superintendent of the Apiary.
John R. Boardman, New York City, Lecturer on Rural Leadership.
Jennie Buell, Ann Arbor, Mich., Lecturer, Michigan State Grange.
Alexander E. Cance, Ph.D., Associate Professor of Agricultural Economics.
Joseph S. Chamberlain, Ph.D., Professor of Organic and Agricultural Chemistry.
William D. Clark, M.F., Professor of Forestry.
Laura Comstock, Extension Professor of Home Economics.
Samuel Coons, Instructor in Dairying.
Philip H. Elwood, Jr., B.Sc.Agr., Extension Instructor in Civic Improvement.
R. Hay Ferguson, Extension Professor of Agricultural Economics.
Henry T. Fernald, Ph.D., Professor of Entomology, Chairman of Division of Science.
G. Walter Fiske, LL.D., Oberlin, O., Dean, Oberlin Theological Seminary.
Burton N. Gates, Ph.D., Assistant Professor of Beekeeping.
Harold M. Gore, B.Sc., Assistant in Physical Education.
John C. Graham, B.Sc.Agr., Professor of Poultry Husbandry.
Charles R. Green, B.Agr., Librarian.
F. Josephine Hall, A.M., Waltham, Mass., Adviser for Women.
Sidney B. Haskell, B.Sc., Associate Professor of Agronomy.
Ernst Hermann, Newton, Mass., Director, Playground Association.
Curry S. Hicks, B.Sc., Associate Professor of Physical Education and Hygiene.
Lorian P. Jefferson, A.M., Expert Secretary, Division of Rural Social Science.
Elizabeth Jenkins, Sandwich, Mass., Graduate Student, University of Wisconsin.
William Chauncy Langdon, New York City, President American Pageant Association.
William P. B. Lockwood, B.Sc.Agr., Professor of Dairying.
A. H. MacLellan, Lecturer in Horticulture, MacDonald College, Quebec.
Frederick A. McLaughlin, B.Sc., Instructor in Botany.
John A. McLean, A.B., B.Sc.Agr., Associate Professor of Animal Husbandry.
Kathleen Marsh, Lowell, Mass., Lowell Normal School.
Charles J. Maynard, West Newton, Mass., Author and Lecturer on Bird Life.
Orion A. Morton, Extension Professor of Agricultural Education.
Ezra L. Morgan, A.M., Extension Professor of Community Organization.
Ethel H. Nash, Extension Assistant in Agricultural Education.
Arno H. Nehrling, Associate Professor of Floriculture.
A. Vincent Osmun, M.Sc., Associate Professor of Botany.
Samuel R. Parsons, B.Sc., Instructor, Pennsylvania State College.
Charles A. Peters, Ph.D., Associate Professor of Inorganic and Soil Chemistry.
Edward Tallmadge Root, Boston, Mass., Secretary, Federation of Churches of Massachusetts and Rhode Island.
Frederick W. Ried, Framingham, Mass., Director of Practical Arts, State Normal and Training schools.
Fred C. Sears, M.Sc., Professor of Pomology.
Leone E. Smith, B.S., Scout Master, Boys' Camps.
George E. Stone, Ph.D., Professor of Botany.
Frank A. Waugh, M.Sc., Head of Division of Horticulture and Professor of Landscape Gardening.

A bulletin describing the summer schools is issued in March each year, and may be had upon application to the Supervisor of Short Courses.

C. Miscellaneous Short Courses.

1. Short Courses for Special Groups. — Plans are now under way to provide short courses at Amherst, lasting four or five days, for fertilizer agents, feed agents and dealers, milk inspectors, seed dealers, and other groups desiring such instruction. Information concerning these may be obtained by writing the Extension Service.

2. Special Days for Foreigners. — Each year there are provided at the college special days for foreigners, especially the Polish farmers, of whom there are many in the Connecticut valley. Instruction is given in the phases of agriculture to which this section is best adapted. Instruction is given in soil management, co-operation, American citizenship and history. Similar work among foreigners will be arranged at the College, or in different sections of the State.

3. Meetings of Organizations at the College. — It is customary for the various State organizations of fruit growers, poultrymen, breeders' associations and others to meet for conventions and picnics at the college. Such meetings are welcomed by the college authorities, and organizations are cordially invited to meet at the college. The Extension Service provides facilities for seeing the college grounds, and will assist in arranging programs and other forms of instruction and entertainment.

All requests for announcements or further information regarding any of the short courses should be addressed to the Supervisor of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

THE EXTENSION SERVICE.

Correspondence Courses. — The correspondence courses are offered in response to calls from all sections of the State from people who desire information on agriculture, home economics and country life problems, but who cannot come to the college for it. They are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners, floriculturists, teachers, home makers and all others interested in the farm, the farm home and the rural community.

It is their purpose to present the latest information in such language that all who pursue the study can readily understand the work.

Method of conducting Correspondence Work. — Many books have been written on various agricultural subjects, yet very few are adaptable to the correspondence course work. For this reason the courses consist largely of specially prepared lessons. The subject-matter partakes somewhat of the lectures that are given in the college classes. Certain courses are based wholly on text-books, however, while a number combine both methods. In any case it is recommended that the student purchase one or two books for collateral reading. These can often be obtained from the local library.

The courses are especially recommended to granges, farmers' clubs, Y. M. C. A.'s, and similar organizations. If grange lecturers, club secretaries and other interested persons will organize study classes, and the size of the class or the interest in the subject is sufficient, the supervisor of correspondence courses will gladly meet with the class from time to time to discuss the work and offer suggestions. Below are listed the courses offered for 1915: —

1. Soils and Soil Improvement. Associate Professor Haskell.
2. Manures, Fertilizers and Soil Amendments. Associate Professor Haskell.
3. Field Crops. Assistant Professor McDonald.
4. Farm Dairying. Professor Lockwood.
5. Fruit Growing. Professors Sears, Chenoweth and Mr. Rees.
6. Market Gardening. Mr. H. F. Tompson.
7. Animal Feeding. Mr. Story.
8. Floriculture. Associate Professor Nehrling.
9. Farm Accounts. Professor Foord.
10. Entomology. Professor Fernald.
11. Pedagogy of Agriculture. Professor Fernald.
12. Beekeeping. Associate Professor Gates.
13. Forestry. Professor Clark.
14. Shade Tree Management. Associate Professor Osmun.
15. Gardening and Elementary Agriculture. Extension Professor Morton.
16. Poultry Husbandry. Professor Graham.
17. Home Economics. Extension Professor Comstock.
18. Rural Sociology. Mr. Baird.

Enrollment for Correspondence Courses. — Students may enroll in the courses at any time between October 1 and June 1 of the following year. It has been found advisable to discontinue the courses through the summer months, as farmers and other students cannot devote the necessary amount of time to the lessons at this season.

Expenses of the Correspondence Courses. — In order that none may enroll except those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at $1 for each course except Courses 8, 17 and 18, where it has been found advisable to charge $1 for each of the parts. The fee is payable strictly in advance, at the time the enrollment card is sent.

Lectures and Demonstrations. — The members of the faculty of the college are, when other duties will permit, available for lectures and demonstrations before granges, men's clubs, women's clubs, Y. M. C. A.'s, farmers' clubs, boards of trade, and other organizations. A list of more than 40 lecturers and 200 subjects on various phases of agriculture, country life, economics, sociology, education, civic betterment and various scientific subjects has been prepared. Full courses of lectures or single lectures may be arranged.

Organizations arranging the lectures are asked to pay the traveling expenses of the lecturer, provided no admission fee is charged. When admission is charged the lecturer is entitled to a fee in addition to traveling expenses.

Extension Schools. — The extension schools are of two distinct types, the first being the Agricultural Extension School, dealing with the production side of farming and with the problems of the farm home; the second being the Extension School in Community Planning, having to do with the organization and selling end of agriculture and with instruction in the planning and carrying forward of various community activities.

Agricultural Extension Schools. — The college sends a corps of instructors to a town for a five-day school of instruction. At present the following courses are offered: soil fertility, animal husbandry and dairying, fruit growing, poultry husbandry and vegetable gardening for the men, and a home makers' course for the women. Morning and afternoon sessions only are held.

Community Planning Extension Schools. — These schools are arranged to extend over at least three days. The following courses are offered: education, agricultural organization, community program, civic improvement, farm management, town administration, public health, community recreation and

home making. Morning, afternoon and evening sessions are held in these schools.

It is also possible to arrange special extension schools along one line of work, such as fruit growing, dairying, etc.

Communities desiring an extension school make a written request, agreeing to defray all local expenses, such as the rent, heating and lighting of a suitable hall, and the board of the instructors during the school.

Educational Exhibits at Fairs and Other Shows. — The college co-operates with the managers of fairs, industrial expositions, corn shows, poultry shows, fruit shows and other exhibitions by making educational exhibits.

For outside work a large tent has been provided. In this about thirty cabinets containing educational material are arranged. A corps of lecturers and demonstrators accompany the exhibit and give practical instruction daily.

For inside work a space at least 40 by 60 feet is required for this exhibit.

Smaller exhibits along special lines are sent to corn, fruit and poultry shows, milk shows, child welfare exhibits, and so forth.

The managers of fairs and exhibits are required to partially meet the cost of presenting these exhibits.

Educational Trains. — The college, through the Extension Service, will co-operate with railroad and trolley lines in the operation of educational trains and cars. The railroad usually furnishes the means of transportation; the college prepares the exhibit and provides the lecturers and demonstrators.

Extension Work in Special Fields.

Extension Work in Fruit Growing. — This work includes lectures and demonstrations on laying out and planting orchards, pruning, spraying, thinning, grading, packing and marketing fruits. Demonstration orchards, new and renovation plots, are being established all over the State, under a co-operative agreement between the college and the owners of land. Extension schools in fruit growing and fruit grading and packing are arranged on request. Visits to farms for advisory work are made, and correspondence on orcharding subjects is invited.

Extension Work in Animal Husbandry. — This work includes lectures, demonstrations and advisory assistance on subjects pertaining to cattle, horses, sheep and swine, as well as instruction in barn planning. Assistance in organizing dairy improvement associations and breeders' associations is given; stock-judging contests for boys are arranged at the leading fairs.

Extension Work in Dairying. — This includes lectures and demonstrations on the handling and care of milk, cream, butter and cheese; Babcock testing, dairy utensils and dairying manufactures. Educational campaigns may be arranged in different communities, seeking to educate producers, dealers and consumers as to the production and distribution of clean, safe milk.

Control Work in Hog Cholera. — This work is done co-operatively by the college and the United States Department of Agriculture. The work includes lectures upon the disease, demonstrations of inoculation of hogs with the anti-hog cholera serum, inspection of suspected herds and advisory assistance.

Extension Work in Poultry Husbandry. — In addition to conferences at the college and visits to the plants of poultrymen, advice on general poultry

management, diseases, mating, laying out and planning buildings, this work includes co-operative work with State institutions, county schools of agriculture, agricultural departments in high schools, manual training departments in public and normal schools, exhibits of poultry appliances at fairs and shows and other incidental phases.

Extension Work in Farm Management, Field Studies and Demonstrations. — This is carried on co-operatively between the college and the office of farm management of the United States Department of Agriculture at Washington. It consists of a study of farm conditions and farm management problems; instruction in keeping farm accounts and growing field crops; the use of fertilizer and lime; advice as to farm equipment, buildings, and so forth.

Extension Work in Civic Improvement. — This is carried on in connection with the department of landscape gardening at the college. Assistance is rendered in various rural and village improvement enterprises, such as the planting and care of shade and street trees, the planning of playgrounds, school grounds, cemeteries, picnic grounds, the beautifying of water fronts, the rearrangement and development of town commons and reservations of historic interest, and similar activities. Efforts are made to co-operate with local granges, men's and women's clubs, village improvement societies, and like organizations.

Extension Work in Agricultural Education. — This is an organized effort to promote in the public schools of the State the study of agriculture and practical arts relating to country life. This is accomplished by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children, and lectures before granges, farmers' clubs and other interested organizations. The work of the agricultural clubs is under the direction of the superintendent of schools or of some one recommended by him. Each town should hold an annual exhibit of products. Exhibits representing rather extensive districts are incorporated with the various agricultural fairs in the State. In this manner elementary instruction in agriculture is promoted by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College.

Extension Work in Home Economics. — The Extension Service, through its home economics workers, stands ready to assist in solving problems relative to the household in the same manner as it is endeavoring through other workers to aid in working out problems of the farm. The work includes lectures and demonstrations, assistance in forming girls' clubs and home economics clubs for women, and co-operation with existing organizations in the matter of interesting young people in the proper care of the home.

Extension Work in Community Planning. — A number of communities in the State have appealed to the college for aid in bringing the various organizations in the community to a higher state of efficiency, in order that they themselves might take definite steps toward community development and advancement. The college is now prepared to make scientific studies of communities which lead up, by means of surveys, to the organization of local committees to study the agricultural, educational, religious, transportation, recreation and civic needs of the communities. Several State organizations and some national organizations are usually brought in to aid in working out the plans presented by these committees. Conferences on community affairs

are held upon request. The college acts merely in an advisory capacity, the communities themselves doing the actual organization work.

Demonstration Auto-truck. — In order to reach all communities of the State more effectively, a demonstration auto-truck has been procured. Equipped with spraying apparatus and pruning tools, and with Babcock milk tester and other dairy apparatus, dairy record blanks, farm account blanks, a radiopticon with pictures for illustrative purposes, books, bulletins and pamphlets, this outfit, in charge of a competent instructor or demonstrator, visits towns and farms of the State upon request. The instructor gives lectures and demonstrations appropriate to the agriculture of the community.

Library Extension Work. — This consists principally of loaning to the public libraries of the State general collections of 10 to 30 books and bulletins on agriculture and related subjects. Special collections of smaller size on specified subjects, such as fruit growing, dairying. poultry, beekeeping, home economics, and so forth, are also sent out. These may be kept from four to eight weeks, according to the demand for them. The only expense to local libraries is transportation charge on the books both ways. The college library also supplies, upon request, information regarding books on agriculture and related subjects.

Agricultural Surveys. — To acquire definite information as to existing conditions in rural communities, to be used as a basis for further extension work, agricultural surveys are made. The different organizations and officials in the community, such as the town officers, superintendent of schools and teachers, clergymen, librarians and others, usually co-operate in making such surveys. The survey covers all phases of community life, including soil survey, farm management practices, and the educational, social, religious and recreational life. The inventory is made upon carefully prepared blanks.

Agricultural Co-operation and Marketing. — This work has for its object the establishment of agriculture on a better business basis. Assistance is given in organization of co-operative buying and selling associations, the securing of rural credit, the adoption of better methods of marketing, the establishment of a better market for agricultural produce and other lines of agricultural co-operation.

Massachusetts Agricultural College Agricultural Improvement Association. — This is an organization of ex-students of the college who are now farming in the State and who have banded themselves together for the purpose of promoting the agricultural development of the State by carrying on experiments and demonstrations for the betterment of rural pursuits, by using and encouraging the use of better seeds and animals, by the organization of co-operative societies, and by the dissemination of literature bearing on recent agricultural investigations. Production of high-grade strains of corn and potatoes for the Massachusetts seed trade and work for the improvement of animals are some of their activities.

Demonstration Farms and Plots. — Believing that one of the most effective ways of teaching modern farm practice is by the establishment of demonstrations (not experiments) in all sections of the State, thus showing a man on his own land and under his own conditions the result of proper farm practices, the college is placing demonstration plots throughout the State, showing the proper fertilization for grass and other crops, the results of rotations, the proper care of orchards and dairy management. For several years the Faunce Demonstration Farm has been under the advisory direction

of the college, as is also the Paige farm at Hardwick. The Faunce farm has proved to the Cape Cod region that small fruits, poultry and vegetables can be successfully grown there. Demonstration farms are usually managed by a committee or board of trustees representing the farm and a committee appointed from the college acting jointly.

County or District Agricultural Agents. — As rapidly as State, government and local funds are available, men trained in agriculture are being assigned to counties and districts of the State to act as agricultural agents. Residents of the county or district may, without cost, call upon the agent for assistance upon any agricultural subject. The work is being developed through the co-operation of the United States Department of Agriculture, the college and the community engaging the agent.

Advisory Work with Institutions and Individuals. — Special effort is made to comply with as many of the requests of State institutions and individuals who ask for advice on farm problems as possible. The force of instructors available for this work is at present insufficient to take care of all the demands.

Publications of the Extension Service. — In addition to the regular circulars and bulletins which announce the various short courses and lines of work mentioned, a monthly pamphlet, "Facts for Farmers," giving timely information on agricultural subjects, is issued. Large numbers of helpful circulars and bulletins are annually distributed. Reports of the work of the Extension Service, dairy record blanks, farm account blanks, boys' and girls' club circulars, lists of books, and so forth, may be had upon request.

Co-operation with Other Organizations. — The aim of the Extension Service is to co-operate with existing organizations so far as possible. It is, therefore, glad to work with local organizations, and welcomes suggestions from such organizations as town officers, local granges, farmers' clubs, women's clubs, Y. M. C. A.'s, Y. W. C. A.'s, boards of trade, village improvement societies, teachers, clergymen, librarians and others interested in agriculture and country life.

Information by Correspondence. — Besides the activities mentioned, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry, which always receive the most careful attention from every department of the institution.

Student Extension Work. — The Social Service Commission of the college is an organization supported by voluntary subscription. The commission employs an executive officer known as the Social Service Secretary, who, in co-operation with the Extension Service, endeavors to assist the students of the college in doing such extension work as their duties may permit. This consists of lectures and demonstrations on agricultural subjects, teaching English and civics to foreigners, coaching and supervising athletic contests with boys and girls, helping to organize and conduct debating societies and Bible classes, giving talks on true sportsmanship and clean living, giving musical entertainments, and acting as judges and helpers at fairs and other exhibits.

Pamphlets and bulletins are sent free to all who apply for them, and correspondence from any who desire such help as has been mentioned should address the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

General Information.

General Information.

A. FINANCIAL AND ADMINISTRATIVE.

STUDENT EXPENSES.

Tuition.[1] — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $40 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.

Beginning Sept. 1, 1915, all students entering the college for the first time as undergraduates or special students will be charged a matriculation fee of $5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

Dormitories and Board. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present the price of board there is about $4 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

EXPENSES.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts free; other citizens of the United States, $40 a year; foreigners, $120 a year.

	Low.	High.
Matriculation fee, first year,	$5 00	$5 00
Room in college dormitories or in private houses,	39 00	110 00
Board in college dining hall, $4 a week,	144 00	144 00
Laundry, 50 cents to 85 cents a week,	18 00	30 00
Military uniform, first year,	17 85	17 85
Laboratory fees,	2 00	20 00
Books, stationery and miscellaneous items,	14 15	23 15
	$240 00	$350 00

[1] This statement applies to those registering as regular or unclassified students.

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $275 and $375 per year.

Initial Charges.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee,	$5 00	–	–
Board (if at college dining hall) four weeks in advance,	16 00	$16 00	$16 00
Subscription to "Collegian" (college paper),[1]	1 50	1 50	1 50
Assessment for support of Social Union,	1 50	1 50	1 50
Laboratory fees: —			
Chemistry,	5 00	–	–
Zoölogy,	–	2 00	–
For elective subjects,	–	–	1 00–10 00
Military uniform,	17 85	–	-
Room rent (if in college dormitory),	–	–	19 50–33 00
Student tax for support of athletics,[1]	8 00	8 00	8 00
	$54 85	$29 00	$47 50–$70 00

[1] While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

Laboratory Fees.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present, the fees charged are as follows: —

	Per Semester.
Agronomy: —	
Course 3,	$1 50
Course 4,	50
Courses 5 and 6,	1 00
Animal husbandry: —	
Courses 2 and 4,	1 00
Course 7,	2 00
Botany: —	
Courses 2, 3, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16,	3 00
Course 4,	2 00
Course 5,	1 00
Chemistry: —	
Courses 1, 2, 7, 8, 13, 15,	3 00
Courses 3, 4, 5, 6,	4 00
Courses 9, 10, 11, 12, 14, 16,	5 00
Dairying: —	
Courses 1, 2, 3,	1 00
Entomology: —	
Courses 3, 4,	3 00
Landscape gardening: —	
Landscape gardening 1, 2,	2 50
Landscape gardening 3, 4, 7, 8,	3 00
Landscape gardening 6,	1 00
Drawing 1, 2,	2 50
Mathematics: —	
Courses 6, 10,	1 00
Microbiology: —	
All courses, each,	5 00
Pomology: —	
Courses 3, 4,	2 50
Poultry Husbandry: —	
Course 3,	1 50
Course 4,	2 00
Zoölogy: —	
Course 1,	2 00
Courses 3, 4,	4 00

STUDENT AID.

Self Help. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should under-

take work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and sixty or more students are employed at the dining hall. Application for student labor should be made directly to the President. Applicants are required to present statements from parent or guardian and from a selectman or alderman of the town or city in which they reside, showing that the applicant needs assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

Special Notice to Needy Students. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

STUDENT ACCOUNTS.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each semester. This rule is strictly adhered to, and no student will be allowed to register in his class until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the semester he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

STUDENT RELATIONS.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the President for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its President or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

B. COLLEGE ACTIVITIES.

GENERAL EXERCISES.

Chapel exercises are as a rule held four mornings each week. On Wednesday, instead of chapel an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the President is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

STUDENT ACTIVITIES.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about six years ago. All students become members of the Union by paying a small fee. The Union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study; in the basement of this building there is also a game room for pool and billiards. In the fall and winter months the Union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The M. A. C. Christian Association is active both socially and religiously. Under its direction voluntary Bible classes are conducted during the winter months. A Catholic Club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A Dramatic Club has been organized, and each year presents a play.

The Press Club, organized in 1913–14, has headquarters in the English-Journalism room, but is soon to have a news room of its own in North College.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and tennis.

A Rifle Club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Massachusetts Collegian," published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture and horticulture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Scientific clubs also exist in the departments of French, entomology, landscape gardening and zoölogy.

There has recently been organized a Collegiate Country Life Club, the membership of which is composed of faculty and students who are particularly interested in the study of country life problems.

C. ACADEMIC AND DEPARTMENTAL.

DEGREES.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

PRIZES.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1914 were: —

Agriculture. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq.,

of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

Animal Husbandry. — The F. Lothrup Ames Prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live-stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

Botany. — The Hills prizes, given by Henry F. Hills of Amherst, amount to $35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, $20; for the second-best herbarium, $15. No collection deemed unworthy of a prize will be considered.

Entomology. — In 1914 a special prize of $5 was offered to that member of the junior class presenting the best collection of insects.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character and example.

Public Speaking. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

EQUIPMENT.

Agricultural Education. — The courses in this department are planned primarily for those who are preparing to teach. The work is carried on by means of lectures, library and demonstrations. The department has an office, lecture room and a laboratory in the Veterinary Science building. The laboratory is equipped with a balance, dishes, jars, reagent bottles, test tubes, petri dishes, lenses, a Babcock test, a Wisconsin sediment test, Bunsen burner, hot and cold water, electricity, gas and other appliances for giving demonstration and practice lessons in Secondary Agriculture. There is also equipment for conducting children's gardens on the campus. Instruction in school gardens constitutes a part of the practice work of those training for the occupation of teaching. Some practice work in teaching is done in the grammar grades of the Amherst schools, and in the agricultural departments of Hopkins' Academy, and Smith's Agricultural School at Northampton. This department is also intimately related to the matter of recommending candidates for teachers' certificates. At least four courses in the department are required of students preparing for such certificate. The office is supplied with school and college reports, also a large number of pamphlets and bulletins

relating to the subject of agriculture in the schools, courses of study, etc. See note relative to teachers' certificates, under major in Agricultural Education.

Agronomy. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of plants of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is equipped with apparatus for studying the physical properties of soils, and with tools used in the reclamation of land by drainage and by irrigation. A large part of the work is done in the field, the college farm being used as a laboratory.

Animal Husbandry. — An accurate and definite knowledge of the market types and grades, and of the various breeds of live stock, is fundamental to the work of this department. The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180, and which is fully adapted to the requirements. There are upwards of 125 head of dairy cattle of various ages available for class-room work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Yorkshire pigs are maintained. The college possesses pure-bred Percherons and French coach horses, besides many work teams of different types, which are available for class-room purposes. A set of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different foodstuffs available for the use of the New England farmer, are included in the equipment for this work. An excellent set of upward of 250 lantern slides, portraying the leading prize-winning, producing, and breeding animals of the leading breeds, — horses, cattle, sheep and swine, — belongs to this department, and is regularly used in instructional work. This equipment is being added to from time to time as funds are available.

Botany. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant

physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 18,000 sheets of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 20,000 specimens of fungi. The laboratory is equipped with 94 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

Chemistry. — The college department of chemistry occupies the entire building previously known as the "old chapel." The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to organic, physiological and physical chemistry, and qualitative analysis. The second floor is occupied by the general lecture room, by offices for the several members of the staff and by laboratories for analytical chemistry. The third floor has been fitted for work in general chemistry, and has desk room and hoods sufficient to accommodate 66 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 100 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

Dairying. — The dairy work is given in Flint Laboratory, a new building, designed for the dairy department. It contains large, well-lighted, sanitary and well-equipped laboratories. The equipment is new and of the best types of market milk and farm dairy machines.

Dining Hall. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college. The building contains a limited number of rooms for young women students.

Drawing. — The class in drawing occupies a room on the second floor of Wilder Hall. It is equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

Entomology. — *General Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped, and it

will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room chemical desks and apparatus provide opportunities for the determination of the impurities and adulterations of insecticides. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

Entomology. — *Beekeeping.* — For this work the main office, museum and lecture rooms are in the entomological building. There is also an apiary covering approximately two acres which will consist of about fifty colonies of bees in various types of hives and maintained for the several practical and experimental purposes. The apiary also includes a collection of nectar-yielding plants representative of the native flora as well as of the more important nectar sources from other localities. Especial opportunity is therefore given for a study of this fundamental problem of forage. Upon the apiary site is an eight-room building (the first in the world erected exclusively for teaching beekeeping) modeled to meet both the requirements of teaching and of a practical apiary. This building contains a boiler room, capacious wintering cellar, wax extraction room, general carpenter and work shop, laboratory, office, honey extraction room and stock room. The beekeeping equipment also includes an unexcelled collection of apicultural implements, natural history specimens and other curiosities. Practically every device used in American apiculture is available, it being the aim of the department to procure new inventions and implements as fast as they appear for the purpose of study and comparison. Available to the students is a private library of apicultural literature consisting of upwards of 900 volumes and papers, possibly the most complete collection in the country. This entire equipment is acknowledged unique in model and in completeness for the United States and for the world.

Farm Administration. — The college farm of 250 acres is under the general supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

Floriculture. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. There has been erected a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The department of forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings is located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distances of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects.

Geology. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes. The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

Heating, Lighting and Power. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop and well-equipped carpenter shop.

Landscape Gardening. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape

gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

Library. — The library — stack room, reading room and office — occupies the entire lower floor of the Chapel-library building. It contains nearly 45,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular and short-course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.30 A.M. to 9.30 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

Market Gardening. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and laboratory particularly equipped for market gardening. A good library of works on vegetable gardening is available.

Mathematics and Civil Engineering. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Military Science. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60

by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

Physical Education. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The main floor is used for basket ball, indoor baseball and hand ball. The gallery has been fitted up as a special exercise and gymnastic room, and is equipped with modern developing apparatus, including parallel bars, horses, bucks, chest weights, dumb bells, Indian clubs and striking bags. An outdoor board track enables students to secure track practice through the winter, and two ice hockey rinks give ample opportunity for hockey practice. Credit is given to all students taking part in outdoor activities. "Treks" are held twice a week, and whenever possible snowshoe and skiing hikes are also held. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a shower-room. The gymnasium classes are held the last two hours in the morning and the last two hours in the afternoon, but students may use the gymnasium at other times for exercise purposes by arrangement with the department. The regulation costume for class exercise consists of a white track suit and white rubber-sole shoes.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Pomology. — The department of pomology has 45 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There are also two commercial vineyards, and a smaller one in which are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collec-

tion of more than 100 wax models of apples, plums, pears and peaches, in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1912–13, for instance, apples for class use were received from Idaho, Missouri, Utah, Washington, Maine, Connecticut, Pennsylvania, Montana, Minnesota, Nebraska, Kentucky, Iowa, Wisconsin, Michigan, New York, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrus fruit from Florida and Texas. From the college fruit plantations the following fruits were available: grapes, fifty varieties, representing three native American species and several hybrids; twenty varieties of peaches, twenty varieties of pears, twenty-five varieties of plums, eighty varieties of apples.

Poultry Husbandry. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar, 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, cramming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; a combination laying, testing and breeding house, 18 by 72, for experimental purposes and a model laying house, 18 by 30, for 100 hens; the 6 old experiment station buildings, each 12 by 18 feet, to be used as breeding houses; 14 colony houses; 8 growing crops; a manure shed, 14 by 18 feet; and an oil house, 10 by 12 feet. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chicken, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

Public Speaking. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests offer a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollegiate contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

Veterinary Science. — The department of veterinary science occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the departments of entomology and zoölogy-geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 3 floor cases with space for 9 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 6 P.M. The curator is Associate Professor Gordon.

PRIZES AND AWARDS, 1914.

Grinnell Prizes. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York to those members of the senior class who pass the best, second best, and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, $25, awarded to Warren Sears Baker.

Second prize, $15, awarded to William Ashmun Davis.

Third prize, $10, awarded to Theodore Arthur Nicolet.

General Improvement. — The Western Alumni Association prize, given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character and example was $25. This prize in 1914 was divided equally between Thomas Lincoln Harrocks and Raymond Alson Mooney.

Hills Botanical Prizes. — Awarded to the members of the sophomore class for the best and second best herbaria, as follows: —

First prize, $20, awarded to Kenneth Bradford Laird.

Second prize, $15, awarded to Thomas Carlton Upham.

Public Speaking. — The Burnham prizes, given to the students delivering the best and second best declamations, were awarded as follows: —

First prize, $15, awarded to Lincoln David Kelsey, 1917.

Second prize, $10, awarded to Suran Donald Sherinyan, 1916.

The Flint prizes were awarded to the students delivering the best and second best orations, as follows: —

First prize, $20, awarded to Frederick William Read, 1914.

Second prize, $15, awarded to Lincoln David Kelsey, 1917.

Military Honors. — The following-named cadet officers were reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts, as being efficient in military science and tactics and graduating therein with highest honors: —

Col. Stanley Barron Freeborn.

Maj. Harry Dunlap Brown.

Maj. Chester Eaton Wheeler.

Capt. Leone Ernest Smith.

Capt. Nathaniel Kennard Walker.

Capt. Richard Henry Powers.

Entomological Prize. — A special prize of $5, offered in 1914 to that member of the junior class presenting the best collections of insects, was awarded to Robert Theodore Frost, 1915.

SECRETARIES OF ALUMNI ASSOCIATIONS.

Associate Alumni of the Massachusetts Agricultural College.

Secretary: Dr. Charles A. Peters, 1897, Amherst, Mass.

Alumni Secretaries' Association of the Massachusetts Agricultural College.

Secretary: Ralph J. Watts, 1907, Amherst, Mass.

Alumni Club of Massachusetts.

Secretary: P. W. Pickard, 1911, 43 Chatham Street, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.

Secretary: Paul E. Alger, 1909, Warehouse Point, Conn.

Massachusetts Agricultural College Club of New York.

Secretary: Dr. John Ashburton Cutter, 1882, 266 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.

Secretary: Dr. William A. Hooker, 1900, U. S. D. A., Office of Experiment Stations, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.

Secretary: Charles A. Tirrell, 1906, 4012 Perry Street, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.

Secretary: Thomas F. Hunt, 1905, Berkeley, Cal.

Massachusetts Agricultural College Club of Hawaii.

Secretary: Dr. E. A. Bach, 1904, Honolulu, T. H.

Class Secretaries.

Class of	Secretary.	Secretary's Address.
1871	E. E. Thompson,	5 Jacques Avenue, Worcester, Mass.
1872	F. E. Kimball,	8 John Street, Worcester, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	D. G. Hitchcock,	Warren, Mass.
1875	M. Bunker,	28 Park Street, Newton, Mass.
1876	C. Fred Deuel,	Amherst, Mass.
1877	Atherton Clark,	231 Waverley Avenue, Newton, Mass.
1878	C. O. Lovell,	201 Darke Block, Regina, Saskatchewan, Can.
1879	R. W. Swan,	41 Pleasant Street, Worcester, Mass.
1880	Alvan L. Fowler,	413 Post Office Building, Philadelphia, Pa.
1881	J. L. Hills,	59 North Prospect Street, Burlington, Vt.
1882	G. D. Howe,	25 Winter Street, Bangor, Me.
1883	J. B. Lindsey,	Amherst, Mass.
1884	E. A. Jones,	New Canaan, Conn.
1885	E. W. Allen,	1923 Biltmore Street, Washington, D. C.
1886	Dr. Winfield Ayres,	616 Madison Avenue, New York City.
1887	F. H. Fowler,	Shirley, Mass.
1888	H. C. Bliss,	14 Mechanic Street, Attleborough, Mass.
1889	C. S. Crocker,	1003 South 25th Street, Philadelphia, Pa.
1890	David Barry,	398 Walnut Street, Newtonville, Mass.
1891	H. T. Shores,	177 Elm Street, Northampton, Mass.
1892	H. M. Thomson,	Amherst, Mass.
1893	F. A. Smith,	Hathorne, Mass.
1894	S. F. Howard,	Northfield, Vt.
1895	E. A. White,	Ithaca, N. Y.
1896	A. S. Kinney,	South Hadley, Mass.
1897	C. A. Peters,	Amherst, Mass.
1898	W. S. Fisher,	Peace Street Grammar School, Providence, R. I.
1899	D. A. Beaman,	Rio Piedras, Porto Rico.
1900	E. K. Atkins,	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass.
1902	H. L. Knight,	1420 Buchanan Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	Sherborn, Mass.
1905	A. D. Taylor,	1900 Euclid Avenue, Cleveland, O.
1906	Richard Wellington,	St. Anthony Park, Minnesota.
1907	Clinton King,	31 Elm Street, Springfield, Mass.
1908	J. A. Hyslop,	860 North Mulberry Street, Hagerstown, Md.
1909	O. B. Briggs,	1015 Fidelity Building, Baltimore, Md.
1910	F. L. Thomas,	R. F. D. No. 2, Athol, Mass.
1911	L. M. Johnson,	Newtown, Conn.
1912	F. S. Madison,	East Greenwich, R. I.
1913	B. W. Ellis,	Amherst, Mass.
1914	L. Ernest Smith,	Colchester, Conn.

Degrees Conferred and Roll of Students.

Degrees Conferred — 1914.

Doctor of Philosophy.

Merrill, Joseph Henry, Danvers, Mass., Dartmouth, B.Sc., 1909.
Smulyan, Marcus Thomas, Amherst, Mass., Massachusetts Agricultural College, B.Sc., 1909.
Thomas, Frank Lincoln, Athol, Mass., Massachusetts Agricultural College, B.Sc., 1910.

Master of Science.

Ackerman, Arthur John, Worcester, Mass., Massachusetts Agricultural College, B.Sc., 1912.
Fowler, George Scott, Wayland, Mass., Massachusetts Agricultural College, B.Sc., 1912.
Hutson, John Coghlan, Bridgetown, Barbados, Oxford University, B.A., 1909.
Martin, James Francis, Amherst, Mass., Massachusetts Agricultural College, B.Sc., 1912.
Noyes, Harry Alfred, Lafayette, Ind., Massachusetts Agricultural College, B.Sc., 1912.
Parker, Ralph Robinson, Penikese, Mass., Massachusetts Agricultural College, B.Sc., 1912.
Ruprecht, Rudolf William, Brooklyn, N. Y., Rhode Island Agricultural College, B.Sc., 1911.
Tower, Daniel Gordon, Roxbury, Mass., Massachusetts Agricultural College, B.Sc., 1912.

Bachelor of Science (B.Sc.).

Abbott, Leslie Elmer,	Sandwich.
Allen, Carl Murdough,	Holyoke.
Baker, Warren Sears,	Wollaston.
Black, Harold Cotting,	Falmouth.
Bokelund, Chester Story,	Worcester.
Bradley, John Watling,	Groton.
Bragg, Ralph Stanley,	Milford.
Brewer, Harold William,	Mount Vernon, N. Y.
Brooks, Arthur Winslow,	Smiths.
Brown, Harry Dunlap,	Lowell.
Calvert, Melville Bradford,	New London, Conn.
Campbell, Malcolm David,	Still River.
Christie, Edward Wheeler,	North Adams.
Churchill, George Clarence,	Worcester.
Clark, Ernest Samuel, Jr.,	Tolland.
Clay, Harold Johnson,	Cambridge.
Clegg, Frank Jackson,	Fall River.
Coleman, David Augustus,	South Framingham.
Davies, Lloyd Garrison,	Peabody.
Davis, Ralph Edward,	Southbury, Conn.
Davis, William Ashmun,	Northfield.
Dearing, Newton Howard,	Brookline.
Dexter, Evans King,	Mattapoisett.
Dunbar, Erving Walker,	North Weymouth.
Edgerton, Almon Morley,	Mittineague.
Edwards, Edward Clinton,	North Beverly.
Eldridge, Harold Lockwood,	Wareham.
Foster, Stuart Brooks,	West Somerville.
Freeborn, Stanley Barron,	Ware.
Freedman, Samuel Leavitt,	Roxbury.
Frye, Carl Raymond,	South Hadley Falls.
Fuller, George,	Deerfield.
Hadfield, Harold Frederick,	North Adams.
Handy, Ralph Ellis,	Cataumet.

Harris, Rodney Wells,	Wethersfield, Conn.
Hazen, Edward Leonard,	Springfield.
Hebard, Emory Blodgett,	Holland.
Heffron, Frederick,	Sherborn.
Hill, Charles Chase,	Melrose Highlands.
Hogg, Lawrence Jagger,	Lawrence.
Howard, Lewis Phillips,	North Easton.
Hutchinson, John Gouverneur,	Arlington.
Ingham, Earl Morris,	Granby.
Jacobs, Loring Humphrey,	Wellesley.
Jones, Dettmar Wentworth,	Melrose.
Leete, Richard Fowler,	Mount Kisco, N. Y.
Levine, Henry Walter,	Roxbury.
Lincoln, Murray Danforth,	Raynham.
Lucas, Hoyt Dennis,	Springfield.
Lundgren, Arthur Robert,	Orange.
Major, Joseph,	East Rutherford, N. J.
Marsh, Frank Eugene,	Jefferson.
Merkle, Frederick Grover,	Amherst.
Morrison, Harold Ivory,	Melrose.
Morse, Harold John,	Townsend.
Needham, Lester Ward,	Springfield.
Nicolet, Theodore Arthur,	Fall River.
Nicolet, Tell William,	Fall River.
Nissen, Harry,	Boston.
Norton, Leslie Howard,	Newport, R. I.
Nute, Raymond Edson,	Fall River.
O'Brien, Daniel William,	Wayland.
Oertel, John Thomas,	South Hadley Falls.
Parker, Ervine Franklin,	Poquonock, Conn.
Payne, Roland Alfred,	Wakefield.
Pellett, John Doubleday,	Worcester.
Peters, Chester Harry,	Clinton.
Petersen, Peveril Oscar,	Concord.
Porter, Bennett Allen,	Amherst.
Powers, Richard Henry,	Malden.
Read, Frederick William,	Boston.
Reid, George Alexander,	Worcester.
Rosebrooks, Walter Edwin,	West Sutton.
Russell, Alden Hesseltine,	Watertown.
Sahr, Gabriel William Arthur,	Boston.
Sherman, Joel Powers,	Hyannis.
Small, Francis Willard,	North Truro.
Smith, Leon Edgar,	Boston.
Smith, Leone Ernest,	Leominster.
Stevens, Arthur Eben,	Lawrence.
Strange, Sarah Josephine,	Marshfield.
Tarbell, Munroe Gifford,	Brimfield.
Taylor, Arthur Wright,	Feeding Hills.
Taylor, Leland Hart,	Peabody.
Thurston, Arthur Searle,	Everett.
Tower, Alfred Leigh,	Sheffield.
Tupper, Arthur Sommerville,	Roxbury.
Upton, Ernest Franklin,	Salem.
Walker, Nathaniel Kennard,	Malden.
Walker, Raymond Philip,	Taunton.
Warner, Raymond Winslow,	Sunderland.
Webster, Louis Armstrong,	Blackstone.
Weigel, Arthur George,	Lawrence.
Wheeler, Chester Eaton,	Lowell.
Whidden, Burton Clark,	Lowell.
Whippen, Charles Warren,	Lynn.
Wing, John Govan,	Somerville.
Wood, Henry Joseph,	Mendon.

Roll of Students.

Graduate Students — Candidates for a Degree.

Anderson, David Wadsworth, ... Manchester, N. H.
B.Sc., New Hampshire State College.
Avery, Roy Crowdy, ... New York, N. Y.
B.Sc., Connecticut Agricultural College.
Baird, Charles Glenn, ... Powell, Wyoming.
A.B., University of Kansas; A.M., University of Wyoming.
Baker, Herbert J., ... Selbyville, Del.
B.Sc., Massachusetts Agricultural College.
Bales, Harold C., ... North Amherst.
A.B., Dartmouth.
Beals, Carlos Loring, ... Sunderland.
B.Sc., Massachusetts Agricultural College.
Bogue, Robert H., ... North Amherst.
B.Sc., Tufts.
Bourne, Arthur Israel, ... Kensington, N. H.
A.B., Dartmouth.
Bronson, Wesley Hotchkiss, ... Marlborough.
B.Sc., New York State College of Agriculture.
Brown, Henry L., ... Ayer.
B.Sc., University of Maine.
Chapman, George H., ... Amherst.
B.S. and M.S., Massachusetts Agricultural College.
Copson, Godfrey Vernon, ... Grand Rapids, Mich.
B.Sc. in agriculture, Oregon Agricultural College.
Davies, Ernest Langford, ... Guelph, Can.
B.Sc., Ontario Agricultural College.
Foster, Leo T., ... Leominster.
A.B., Holy Cross College.
Frost, Walter S., ... Roxbury.
B.S. in chemistry, Tufts College.
Gurley, Franklin Cornell, ... South Willington, Conn.
B.Sc., Worcester Polytechnic Institute.
Hasey, Willard Harrison, ... Brockton.
B.Sc., Massachusetts Agricultural College.
Hillary, Walter Hoxie, ... Philadelphia, Pa.
B.Sc., Pennsylvania State College.
Holland, Edward Bertram, ... Amherst.
M.Sc., Massachusetts Agricultural College.
Hood, Egerton Gibson, ... Hagermon, Ontario, Can.
B.Sc., Ontario Agricultural College.
Hutson, John Coghlan, ... Bridgetown, Barbados.
A.B., Trinity College, Oxford, Eng.; M.Sc., Massachusetts Agricultural College.
Itano, Arao, ... Okayamaken, Japan.
B.Sc., Michigan Agricultural College.
Lund, Russell Fort, ... West Pelham.
B.A., St. Lawrence University.

Martin, James Francis, ... Amherst.
M.Sc., Massachusetts Agricultural College.
McDougall, Allister F., ... Westford.
B.Sc., Massachusetts Agricultural College.
McLaughlin, Frederick Adams, ... Lee.
B.Sc., Massachusetts Agricultural College.
Merkle, Frederick Grover, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Miller, Stuart Parmelee, ... East Hampton, Conn.
B.Sc., Worcester Polytechnic Institute.
Mutkekar, Satwaji Gundoji, ... Belgaum, India.
B.Agr., Poona Agricultural College, India.
Norton, John Buck, ... Hartford, N. Y.
B.Sc., University of Vermont.
Oberhelman, Carl F., ... Norwood, O.
B.Sc. in agriculture, Ohio State University.
Paige, Beryl Holmes, ... Amherst.
A.B., Mount Holyoke College.
Parker, Ralph Robinson, ... Penikese.
B.Sc. and M.Sc., Massachusetts Agricultural College.
Porter, Bennet Allen, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Regan, William Swift, ... Northampton.
B.Sc., Massachusetts Agricultural College.
Robinson, Harold A., ... Elmwood, N. H.
B.Sc., New Hampshire State College.
Root, George Albert, ... Danbury, Conn.
B.Sc., Connecticut Agricultural College.
Sanctuary, William Crocker, ... Morrisville, N. Y.
B.Sc., Massachusetts Agricultural College.
Serex, Paul, Jr., ... Bloomfield, N. J.
B.Sc., Massachusetts Agricultural College.
Smith, Raymond Goodale, ... Lynn.
B.Sc., Massachusetts Agricultural College.
Strand, Carl J., ... Amherst.
A.B., Augustana College; M.A., University of Illinois.
Taylor, Leland H., ... Peabody.
B.Sc., Massachusetts Agricultural College.
Thurston, Arthur S., ... Everett.
B.Sc., Massachusetts Agricultural College.
Wang, Iu Tso, ... Canton, China.
B.Sc., Cornell University.
White, Edward Albert, ... Ithaca, N. Y.
B.Sc., Massachusetts Agricultural College.
Whittier, Warren Faxon, ... Amherst.
A.B., Harvard University.

Graduate Students — not Candidates for a Degree.

Cowell, Harold Cobb, ... Ashburnham.
A.B., Williams College.
Farrar, Marion A., ... South Framingham.
A.B., Boston University.
Hooker, Elizabeth Robbins, ... Dorchester.
A.B., Radcliffe College.
Martindale, Henrietta, ... La Crosse, Wis.
A.B., Smith College.
Middleton, Frederick Heard, ... Brookline.
A.B., Harvard University.
White, Gertrude Moody, ... Hartford, Conn.
A.B., Vassar.

SENIOR CLASS.

Alden, Charles Harold,	Amherst,	17 Phillips Street.
Allen, Francis Ellwood,	Melrose,	3 North College.
Archibald, Herbert Hildreth,	Waltham,	14 South College.
Banister, Seth Warrener,	Westford,	16 North College.
Bartlett, Edward Russell,	Newburyport,	3 Nutting Avenue.
Bartley, Hastings Newcomb,	Sandwich,	9 South College.
Bemis, Willard Gilbert,	North Brookfield,	Commons Club.
Bennett, John Ingram,[1]	Boston,	66 Pleasant Street.
Bishop, Chester Allen,	Peterboro, N. H.,	7 North College.
Brooks, Gardner Milton,	Boston,	Box 31, M. A. C.
Buell, Frank Weed,	New Haven, Conn.,	5 South College.
Burt, Helen Frances,	West Somerville,	Draper Hall.
Buttrick, John Willard,	Melrose,	18 Nutting Avenue.
Cale, Gladstone Hume,	Springfield,	90 Pleasant Street.
Cande, Donald Hopkins,	Pittsfield,	87 Pleasant Street.
Chase, Alexander Baxter, Jr.,	West Barnstable,	Clark Hall.
Clark, Ellis Fred,	Granby, Conn.,	3 South College.
Cleveland, Waldo Atwood,[1]	Baldwinsville,	Veterinary Laboratory.
Clough, Maurice Joseph,	Boston,	7 South College.
Dalrymple, Andrew Campbell,	Revere,	2 North College.
Damon, Leon Blanchard,	Melrose,	3 North College.
Day, George Allen,	Warren,	1 North College.
Dole, Sumner Alvord,	Shelburne,	11 North College.
Doran, William Leonard,	North Dartmouth,	French Hall.
Draper, Earle Sumner,	Milford,	15 South College.
Farrar, Stuart Kittridge,[1]	Springfield,	96 Pleasant Street.
Fitzgerald, Daniel James,	Worcester,	2 North College.
Flebut, Alpha John,	Amherst,	27 McClellan Street.
Frost, Robert Theodore,	New York, N. Y.,	85 Pleasant Street.
Fuller, Richard,[1]	Salem,	44 Triangle Street.
Goodwin, Malcolm Noyes,	Newburyport,	96 Pleasant Street.
Grant, Harold Davidson,	Methuen,	15 North College.
Griggs, Raymond Bradford,[1]	Chicopee Falls,	11 South College.
Hall, George Morris,[1]	Brookline,	85 Pleasant Street.
Hall, Roderick Chesley,[1]	Worcester,	Beta Kappa Phi.
Harper, James Edward,[1]	New Haven, Conn.,	2 North College.
Harvey, Russell Wilton,	Lanesville,	44 Pleasant Street.
Haskell, Willis Henry, Jr.,	Brooklyn, N. Y.,	116 Pleasant Street.
Hatfield, William Hollis,	Wellesley,	87 Pleasant Street.
Hildreth, Paul Hughes,	Newtonville,	13 South College.
Hotis, Ralph P.,	Evans Mills, N. Y.,	21 Amity Street.
Hyde, George Frederick,	Hartford, Conn.,	Beta Kappa Phi.
Hyde, Harold Gilmore,	Winchendon,	12 North College.
Johnson, Arthur,	Bridgeport, Conn.,	7 South College.
Kelleher, Jerome Joseph,	Turners Falls,	5 East Pleasant Street.
Kennedy, Worthington Chester,	Hardwick,	6 North College.
Lane, Merton Chesleigh,	South Duxbury,	Mathematics Building.
Le Duc, Ashley Cudworth,	Chesterfield,	Commons Club.
Lewis, Daniel James,	Hanson,	96 Pleasant Street.
Lewis, John Kirby,	New Haven, Conn.,	1 North College.
Lincoln, Irving Boin,	Glens Falls, N. Y.,	2 South College.
Lovejoy, John Sumner,[1]	Newburyport,	9 North College.
MacNeil, Ralph Langdel,[1]	Chelsea,	Mathematics Building.
Macy, Philip Arthur,	Oak Bluffs,	10 North College.
Marsh, Franklin Winter,	Amherst,	18 Nutting Avenue.
Marsh, Herbert Vener,	Deerfield,	4 South College.
Massé, Sidney Merton,	Dorchester,	3 South College.
McKechnie, Ray Farrar,	Natick,	11 Pleasant Street.
McLain, Ralph Emerson,	Melrose,	20 South College.

[1] Work incomplete.

Melican George Deady,	Worcester,	8 South College.
Moberg, Eldon Samuel,	Campello,	83 Pleasant Street.
Montague, Enos James,	Northampton,	3 South College.
Moore, Roger Henry,	Beverly,	15 North College.
Navas, Miguel,[1]	Barranquilla, Col., South America.	6 Phillips Street.
Parker, Edwin Kenney,	Northampton,	8 Allen Street.
Parmenter, Ernest Brigham,	Franklin,	13 North College.
Patterson, Robert Earley,	Dorchester,	14 North College.
Pease, Willard Noah Morris,[1]	Amherst,	Brooks Farm.
Pendleton, Harlow Libby,[1]	Dorchester,	Flint Laboratory.
Perry, Gerald Eugene,	Amherst,	Prospect House.
Pike, Joseph Stevens, Jr.,[1]	Somerville,	8 North College.
Potter, George Raymond,	Ludlow,	44 Pleasant Street.
Price, James Albert,	New York, N. Y.,	14 South College.
Rhoades, Paul Whitney,[1]	Malden,	4 North College.
Rogers, Harold Merriman,	Southington, Conn.,	87 Pleasant Street.
Sauchelli, Vincent,	Waterbury, Conn.,	6 Maple Street.
Sears, William Richard,	Woburn,	10 South College.
Severance, Verne Lincoln,	South Hanson,	Mathematics Building.
Sherman, Milton Francis,	South Lincoln,	10 Allen Street.
Simon, Isaac Barney,	Revere,	38 Cottage Street.
Slein, Owen Francis,	New Braintree,	12 North College.
Smith, Hyde,	Worcester,	1 South College.
Spicer, Eber Grant,	New York, N. Y.,	44 Triangle Street.
Spofford, Chester Porter,[1]	South Groveland,	6 North College.
Stanford, Ernest Elwood,	Amherst,	4 Walnut Street.
Taft, Richard Craig,[1]	Oxford,	88 Pleasant Street.
Tarr, Lester Winslow,	Rockport,	90 Pleasant Street.
Tower, Ralph Ernest,	Becket,	College Commons.
Tower, William Reginald,	Sheffield,	Mount Pleasant.
Towne, Edwin Chester,	Waltham,	7 North College.
Upton, Raymond Melville,	Peabody,	Durfee Plant House.
Vener, Benjamin,	Brockton,	1 South College.
Vinal, Stuart Cunningham,	Boston,	10 North College.
Wellington, Benjamin,	Waltham,	15 Phillips Street.
White, Henry Harrison,	West Peabody,	4 South College.
White, Homer Beethoven,[1]	Melrose Highlands,	15 Phillips Street.
Whitmore, Philip Ferry,	Sunderland,	88 Pleasant Street.
Whorf, Paul Francis,	Caribou, Me.,	4 South College.
Wilkins, Alfred Emerson,[1]	Wakefield,	2 South College.
Willey, Harold Cleland Clancey,	Orange,	M. A. C. Plant House.
Williams, Donald,[1]	Catasauqua, Pa.,	85 Pleasant Street.
Wright, Elvin Stanley,	Worcester,	88 Pleasant Street.
Zehrung, Samuel Danford,[1]	Roseville, O.,	81 Pleasant Street.

Junior Class.

Aiken, Harold,[1]	Millis,	82 Pleasant Street.
Anderson, Frank Albert,[1]	Somerville,	12 South College.
Andrews, Francis Marshall, Jr.,[1]	Manchester,	53 Lincoln Avenue.
Barnes, Dwight Fletcher,	Marshfield,	Entomology Building.
Barnes, Fred Leslie Walker,[1]	Plymouth,	90 Pleasant Street.
Bishop, Herbert Walker,[1]	Doylestown, Pa.,	85 Pleasant Street.
Blanpied, Nelson Uhler,	Framingham,	M. A. C. Farm House.
Boyer, Edward Everett Hale,[1]	Lynn,	30 North Prospect Street.
Brazil, William Henry,[1]	Leominster,	116 Pleasant Street.
Bronson, Harold Julian,[1]	Buckland,	Fitts' House.
Caldwell, Harold Nute,[1]	Lowell,	M. A. C. Farm House.
Cardarelli, Emilio Joseph,	Boston,	West Experiment Station.
Chase, Esther Helen,[1]	Holden,	Draper Hall.
Chisholm, Raymond Lincoln,	Melrose Highlands,	66 Pleasant Street.

[1] Work incomplete.

Clapp, Raymond Luckey,	Northfield,	Care of E. F. Gaskill.
Clark, Saxon Dickinson, [1]	Springfield,	Commons Club.
Coe, Alfred Lynn,	Fayetteville, N. Y.,	90 Pleasant Street.
Coleman, Albert Sumner, [1]	Mendon,	6 Maple Avenue.
Coley, William Stanton, [1]	Wilton, Conn.,	87 Pleasant Street.
Courchene, Alcide Telesphor, [1]	North Adams,	Kappa Gamma Phi.
Curran, Harry Ambrose,	Marlborough,	Kappa Gamma Phi.
Cushing, Raymond Alonzo, [1]	West Somerville,	13 Phillips Street.
Danforth, George Newlin, [1]	Foxcroft, Me.,	96 Pleasant Street.
Darling, Homer Chester,	Mendon,	5 South College.
Davis, Frank Leslie, [1]	Hopedale,	North Pleasant Street.
Dickinson, William Cowls,	North Amherst,	North Amherst.
Dodge, Walter Eugene,	Geneva, O.,	13 Phillips Street.
Eldredge, Raymond Chase,	North Abington,	Mount Pleasant.
Estes, Ralph Cary, [1]	South Framingham,	Care of Professor Morton.
Fernald, Charles Henry, 2d,	Amherst,	44 Amity Street.
Fielding, Lester Edward,	Malden,	96 Pleasant Street.
Fisher, George Basil, [1]	Millbury,	88 Pleasant Street.
Gaventa, Harry Reymer,	Swedesboro, N. J.,	Commons Club.
Gilmore, Benjamin Anthony, [1]	Acushnet,	90 Pleasant Street.
Gioiosa, Alfred Anthony,	Dorchester,	16 South College.
Glover, Theodore Whitford, [1]	South Duxbury,	R. F. D. No. 3, Box 79.
Goodwin, Clinton Foster, [1]	Haverhill,	82 Pleasant Street.
Googins, Burton, [1]	Amherst,	35 East Pleasant Street.
Gould, Charles Holt,	Worcester,	88 Pleasant Street.
Gunn, Carlton Merrick,	Sunderland,	90 Pleasant Street.
Hager, Clayton Marden,	Winter Hill,	M. A. C. Store.
Hall, Stanley William,	Saxonville,	96 Pleasant Street.
Harris, William Lombard, Jr., [1]	Deerfield,	90 Pleasant Street.
Harrocks, Thomas Lincoln,	Westminster,	87 Pleasant Street.
Hart, Reginald, [1]	Montague City,	10 North College.
Haskell, Frank Eugene,	Northborough,	82 Pleasant Street.
Hathaway, Charles Edward, Jr., [1]	Somerset,	87 Pleasant Street.
Hemenway, Justin Stanley, [1]	Williamsburg,	37 East Pleasant Street.
Hendry, Arthur Ekman, [1]	Mattapan,	18 Nutting Avenue.
Hicks, Albert James, [1]	Amherst,	East Experiment Station.
Holden, Mae Faustina,	Royalston,	Care of Professor Hasbrouck.
Hunt, Reginald Stuart, [1]	Newtonville,	Commons Club.
Huntington, Charles Albert, Jr.,	Poquonock, Conn.,	96 Pleasant Street.
Jerome, Frederick William, [1]	Stockbridge,	Prospect Street.
Jones, Linus Hale, [1]	Milford,	Care of Mr. Green, Mount Pleasant.
Jordan, Perley Black, [1]	Topsfield,	13 South College.
Kelly, Harold Russell, [1]	Haverhill,	Pease Avenue.
Kilbon, Ralph Gillette, [1]	Springfield,	Brooks Farm.
King, Edward Lee, [1]	Dorchester,	6 South College.
Knapton, Guy Lord,	Lawrence,	Pease Avenue.
Laird, Kenneth Bradford,	Whitman,	79 Pleasant Street.
Lieber, Conrad Hugo,	Jamaica Plain,	Kappa Gamma Phi.
Lindquist, Albert Evert,	Jamaica Plain,	Physics Building.
Little, Harold Greenleaf, [1]	Newburyport,	96 Pleasant Street.
Locke, Wilber Trow,	Lawrence,	85 Pleasant Street.
Lyford, Waldo Preston, [1]	Natick,	13 South Prospect Street.
Mahan, Harold Butterworth, [1]	Boston,	Kappa Gamma Phi.
Mahony, William John, [1]	Sterling,	6 South College.
Mattoon, Harold Gleason,	Pittsfield,	87 Pleasant Street.
Mooney, Raymond Alson, [1]	Plattsburgh, N. Y.,	85 Pleasant Street.
Moses, Charles Wicker,	Ticonderoga, N. Y.,	9 North College.
Mostrom, Harold Augustus,	North Middleborough,	10 Nutting Avenue.
Murphy, John William,	Beverly,	66 Pleasant Street.
Nash, Clayton Wells,	South Weymouth,	Commons Club.
Nicholson, James Thomas, [1]	Leominster,	116 Pleasant Street.

[1] Work incomplete.

O'Brion, Edwin Fulton,[1]	Somerville,	Commons Club.
Palmer, George Bradford,	Brookline,	96 Pleasant Street.
Perry, Edgar Adams,[1]	Attleborough,	21 Amity Street.
Plaisted, Philip Asbury,	Arlington,	15 Beston Street.
Potter, David,	Concord,	9 South College.
Prouty, Stanley Marshall,	North Brookfield,	96 Pleasant Street.
Ray, George Burrill,[1]	Hingham,	Kappa Gamma Phi.
Rich, Gilbert Warren,[1]	Hingham,	Care of Professor Morton.
Richards, Everett Stackpole,	Northampton,	96 Pleasant Street.
Ricker, Dean Albert,	Worcester,	7 North College.
Rogers, Tyler Stewart,	Saxonville,	12 South College.
Rowe, Louis Victor,[1]	Melrose,	90 Pleasant Street.
Russell, Ernest Samuel,	South Hadley,	96 Pleasant Street.
Ryan, William Edward, Jr.,[1]	Stoughton,	5 Sunset Avenue.
Sander, Benjamin Charles Louis,[1]	Cambridge,	College Store.
Sanderson, Everett Shovelton,	Centreville, R. I.,	10 Nutting Avenue.
Scheufele, Frank Joseph,	South Natick,	15 Beston Street.
Schlotterbeck, Lewis,[1]	Roxbury Station, Conn.,	85 Pleasant Street.
Selkregg, Edwin Reimund,[1]	North East, Pa.,	81 Pleasant Street.
Sherinyan, Donald,[1]	Worcester,	35 North Prospect Street.
Simmons, Perez,	Pittsfield,	82 Pleasant Street.
Stearns, Frederick Campbell,[1]	Waltham,	30 Prospect Street.
Strauss, Abraham,	Roxbury,	Clark Hall.
Swan, Durelle,	Dorchester,	18 Nutting Avenue.
Taber, Ralph Fred,	Cooperstown, N. Y.,	Mount Pleasant.
Topham, Alfred,	Lawrence,	116 Pleasant Street.
Upham, Thomas Carlton,[1]	Fitchburg,	53 Lincoln Avenue.
Verbeck, Howard Graves,	Malden,	12 South College.
Walkden, Herbert Halden,	Westford,	Kappa Gamma Phi.
Walker, Henry Marshall,	Brookline,	Kappa Gamma Phi.
Wentworth, Everett Lawrence,	East Dover, Vt.,	30 North Prospect Street.
Wetherbee, Raymond Swift,	Waltham,	90 Pleasant Street.
White, Samuel Alexander,[1]	Boston,	38 College Street.
Whitney, Harold Tichenor,[1]	Mount Vernon, N. Y.,	8 North College.
Whitney, Leon Fradley,	Brooklyn, N. Y.,	96 Pleasant Street.
Wies, Calmy,	Malden,	38 Cottage Street.
Wildon, Garrick Earl,	Melrose Highlands,	66 Pleasant Street.
Woolley, Harold Curtis,	Malden,	96 Pleasant Street.

SOPHOMORE CLASS.

Adams, Henry Leo[1]	Newburyport,	3 Nutting Avenue.
Alcott, William Jefferson,[1]	Everett,	90 Pleasant Street.
Aloe, Myron,[1]	Philadelphia, Pa.,	73 Pleasant Street.
Babbitt, George King,[1]	Boston,	Care of Professor Morton.
Babcock, Philip Rodney,[1]	Lynn,	96 Pleasant Street.
Barnes, Herbert Wesley,	Whitinsville,	Commons Club.
Behrend, Oswald,	Natick,	Commons Club.
Bell, Alfred Whitney, Jr.,[1]	West Newton,	53 Lincoln Avenue.
Bent, Winthrop Herbert,[1]	Watertown,	87 Pleasant Street.
Birchard, John Dickson,	Springfield,	14 Nutting Avenue.
Bisbee, Philip Emerson,[1]	Waitsfield, Vt.,	85 Pleasant Street.
Boaz, William Henry,[1]	Covesville, Va.,	6 Nutting Avenue.
Boles, Robert Stewart,	Dorchester,	4 Chestnut Street.
Bonn, Wesley Copeland,	Grafton,	5 Nutting Avenue.
Booth, Alfred,[1]	Middletown, N. Y.,	Care of Professor Morton.
Boyce, Harold Prescott,[1]	Haverhill,	7 Nutting Avenue.
Bradley, William George,[1]	Groton,	88 Pleasant Street.
Buchanan, Walter Gray,[1]	Chicopee,	97 Pleasant Street.
Buck, Rollin Hugh,[1]	Worcester,	90 Pleasant Street.
Buckman, Lewis Taylor,	Wilkes-Barre, Pa.,	88 Pleasant Street.
Burleigh, Arthur Leslie,[1]	Lynn,	85 Pleasant Street.

[1] Work incomplete.

Burnham, Chester Arthur,	Westford,	Fitts House.
Buttrick, David Herbert,	Arlington,	120 Pleasant Street.
Calderwood, Herbert Hale,[1]	Rockport, Me.,	Nutting Avenue, Care of Mr. Plumb.
Carruth, Glenn Howard,[1]	Orange,	36 North Prospect Street.
Chamberlain, Sumner Fiske,	Holden,	Commons Club.
Chamberlin, Frank Shirley,[1]	South Framingham,	3 McClellan Street.
Chamberlin, Raymond,[1]	New York, N. Y.,	85 Pleasant Street.
Cotton, Elwyn Page,[1]	Woburn,	East Experiment Station.
Cross, Walter Irving,	Hingham,	53 Lincoln Avenue.
Davis, Monsell Henry,	Orange, N. J.,	Care of S. J. Wright.
Day, James Harold,	Hatfield,	16 South College.
Dempsey, Paul Wheeler,	Dorchester,	82 Pleasant Street.
Dickey, Harold Gammell,	Dorchester,	Poultry Plant.
Dinsmore, Donald Sanderson,	Springfield,	88 Pleasant Street.
Dizer, John Thomas,	East Weymouth,	West Experiment Station.
Dudley, Lofton Leland,	Belchertown,	Belchertown.
Duffill, Edward Stanley,[1]	Melrose Highlands,	17 Fearing Street.
Dunham, Henry Gurney,	West Bridgewater,	79 Pleasant Street.
Dunn, Arthur Paul,	Malden,	4 Chestnut Street
Edwards, Francis Gill,[1]	Beverly,	83 Pleasant Street.
Elliot, Ralph William,	Chartley,	Flint Laboratory.
Everbeck, George Charles,	Winthrop,	Care of Mr. Green, Mount Pleasant.
Fearing, Ralph Watson,	Dorchester,	7 Nutting Avenue.
Ferris, Adaline Lawson,	Ridgefield Park, N. J.,	Draper Hall.
Flagg, Wayne McCrillis,[1]	Mittineague,	90 Pleasant Street.
Flint, Oliver Simeon,	Lowell,	120 Pleasant Street.
Goldstein, Maurice,	West Lynn,	58 Pleasant Street.
Graham, Leland Jenkins,	Amherst,	Lincoln Avenue.
Grayson, Emory Ellsworth,	Milford,	Care of Professor Morton.
Groff, Howard Clarkson,[1]	Amherst,	South Pleasant Street.
Gurshin, Carl Alfred,	Lynn,	35 North Prospect Street.
Hagelstein, Charles Henry,	Dorchester,	Kappa Gamma Phi.
Hallett, Charles Hiram,[1]	Mansfield,	120 Pleasant Street.
Harlow, Frank Edward,	Malden,	77 Pleasant Street.
Harlow, Paul Goodhue,	Malden,	77 Pleasant Street.
Heffron, Paul John,[1]	Sherborn,	North Pleasant Street.
Henderson, Elliott,	Hingham,	9 South College.
Higginbotham, Harry,	Taunton,	88 Pleasant Street.
Higgins, Gardner William,	Norfolk,	85 Pleasant Street.
Hill, Edmund Baldwin,[1]	Rutherford, N. J.,	85 Pleasant Street.
Holden, Richard Lynde,	Haverhill,	82 Pleasant Street.
Holder, Ralph Clifton,	Millis,	17 Kellogg Avenue.
Holt, Francis Stetham,[1]	Cambridge,	77 Pleasant Street.
Hooper, Albert Averill,[1]	Lynn,	96 Pleasant Street.
Hubbell, Franklin Homer,	Westport, Conn.,	M. A. C. Farm House.
Illman, Margaret Keble,	Amherst,	Amherst, R. F. D. No. 2.
Irving, William Raymond,[1]	Taunton,	88 Pleasant Street.
Jackson, Richmond Merrill,	Georgetown,	36 North Prospect Street.
Keegan, Thomas Michael,[1]	Worcester,	88 Pleasant Street.
Kelsey, Edmund Dean,[1]	Amherst,	Pelham Road.
Kelsey, Lincoln David,	West Hartford, Conn.,	90 Pleasant Street.
Kinsman, Alfred Oberlin, Jr.,[1]	Merrimac,	17 Kellogg Avenue.
Larson, Frederick Christian,[1]	Everett,	Kappa Gamma Phi.
Latham, Paul Walker,	Norwich Town, Conn.,	96 Pleasant Street.
Lawrence, Milford Robinson,	Falmouth,	83 Pleasant Street.
Light, Brooks,[1]	Milton,	73 Pleasant Street.
Livermore, William Tingley,	Lawrence,	83 Pleasant Street.
Loring, Albert Briggs,	Nantasket Beach,	53 Lincoln Avenue.
Lydiard, Harry Crowther,	Hartford, Conn.,	3 Nutting Avenue.
Mack, Walter Adams,	Springfield,	Kappa Gamma Phi.

[1] Work incomplete.

MacLeod, Daniel Johnston,[1]	Wakefield,	Care of S. J. Wright.
Mars, Malcolm Rowe,[1]	Walpole,	20 South College.
Mather, Fred,	Amherst,	Fitts House.
Mayo, Frank Willard,[1]	Houlton, Me.,	120 Pleasant Street.
Mayo, William Irving, Jr.	Framingham,	M. A. C. Farm House.
McRae, Herbert Ranklin,[1]	Malden,	15 Fearing Street,
Merrill, Dana Otis,	Pepperell,	Commons Club.
Moorhouse, Newell,	Worcester,	10 South College.
Nash, Herman Beaman,[1]	Amherst,	R. F. D. No. 1.
Nelson, John Brockway,	Newburyport,	3 Nutting Avenue.
Nims, Homer Willis,	Montague,	Experiment Station.
Noyes, Samuel Verne,	Georgetown,	90 Pleasant Street.
Patton, Willard Ginn,	South Framingham,	M. A. C. Farm House.
Pierce, Harold Barnard,[1]	Kansas City, Mo.,	80 Pleasant Street.
Pike, Chester Arthur,[1]	Smiths,	82 Pleasant Street.
Pratt, Harold Arthur,	Shrewsbury,	Care of Professor Morton.
Quimby, Charles Frederick,	Cape Neddick, Me.,	33 East Pleasant Street.
Randall, Earle MacNeill,	Somerville,	82 Pleasant Street.
Richardson, Lewis Elmer,[1]	Rockville,	82 Pleasant Street.
Ritter, Ernest,	New Britain, Conn.,	88 Pleasant Street.
Rodger, Raymond Miller,	Everett,	90 Pleasant Street.
Rogers, Roland Winsor,	Roxbury,	25 Lincoln Avenue.
Rorstrom, Hans Alfred,	Boston,	82 Pleasant Street.
Rosequist, Birger Reignold,	Brockton,	85 Pleasant Street.
Ross, Louis Warren,[1]	Arlington,	120 Pleasant Street.
Rutter, Walter Frederick,[1]	Lawrence,	17 Fearing Street.
Saidel, Harry Samuel,[1]	Worcester,	3 Nutting Avenue.
Sargent, George Leonard,[1]	Merrimac,	17 Kellogg Avenue.
Sauter, John Martin,	Turners Falls,	60 Pleasant Street.
Saville, William, Jr.,	Waban,	6 South College.
Schaefer, Leonard Charles,[1]	Amherst,	Entomology Building.
Schwab, Andrew Nathan,[1]	Yalesville, Conn.,	M. A. C. Plant House.
Scott, George Alvin,	Clinton,	36 North Prospect Street.
Shumway, Paul Edward,[1]	Greenfield,	60 Pleasant Street.
Sims, James Stanley,[1]	Melrose,	120 Pleasant Street.
Smith, Herbert Dwight,	Poughkeepsie, N. Y.,	Care of E. N. Davis.
Smith, Philip Lawrence,[1]	Kingston,	5 Sunset Avenue.
Smith, Richard Woodworth,	Pittsfield,	96 Pleasant Street.
Spaulding, Almon Whitney,	Dorchester,	18 Nutting Avenue.
Squires, Paul Revere,[1]	Belchertown,	Belchertown.
Stackpole, Frank Charles,[1]	Somerville,	82 Pleasant Street.
Stearns, Carlton McIntyre,	Melrose,	5 Nutting Avenue.
Stiles, Albert Ralph,	Arlington,	36 North Prospect Street.
Stjernlof, Axel Uno,	Worcester,	Brooks Farm.
Stowell, Harold Thurber,	Amherst,	193 South Pleasant Street.
Sturtevant, Warner Butterfield,	Springfield,	14 Nutting Avenue.
Swift, Raymond Walter,	North Amherst,	76 Summer Street.
Thayer, William Wallace,[1]	Somerville,	Care of Mr. Green, Mount Pleasant.
Tuthill, Samuel Fuller,	Mattapoisett,	M. A. C. Farm House.
Upson, Everett Langdon,[1]	New Britain, Conn.,	87 Pleasant Street.
Walbridge, Henry Blood,	Bennington, Vt.,	M. A. C. Farm House.
Warner, Merrill Pomeroy,	Sunderland,	5 South College.
Warren, Harold Manson,[1]	Melrose,	5 McClellan Street.
Warren, James Joseph,	North Brookfield,	35 North Prospect Street.
Webster, Frank Cedric,	Harvard,	82 Pleasant Street.
Westman, Robert Clayton,	Roslindale,	Kappa Gamma Phi.
Whitcomb, Warren Draper,	Waltham,	88 Pleasant Street.
Whitney, Joseph Fradley,[1]	Brooklyn, N. Y.,	96 Pleasant Street.
Wilber, Charles Raymond,	Walpole,	Care of Professor Sears.
Williams, Arthur Franklin,	Sunderland,	7 South College.
Williams, Herbert Clifton,	South Hadley Falls,	29 Pleasant Street.

[1] Work incomplete.

FRESHMAN CLASS.

Additon, Elizabeth Emery,[1]	Newtonville,	Draper Hall.
Allen, Amos Lawrence,	Dalton,	35 North Prospect Street.
Allen, Leland Christy,	Holyoke,	75 Pleasant Street.
Allen, Ralph Emerson,	Everett,	17 Phillips Street.
Babbitt, Frank Madison,	Fairhaven,	M. A. C. Farm House.
Bainbridge, Frank,	Paterson, N. J.,	Care of Mr. Whittier, Mount Pleasant.
Baker, Foster Kenneth,	Fairhaven,	116 Pleasant Street.
Baker, Henry Raymond,	Amherst,	West Street.
Barbour, Francis Collin,	Hartford, Conn.,	87 Pleasant Street.
Barton, George Wendell,	North Sudbury,	36 North Prospect Street.
Baxter, Herbert Hill,	Brighton,	15 Phillips Street.
Beadle, Herbert Ocumpaugh,	Lima, N. Y.,	6 Phillips Street.
Bennett, Edgar Stearns,[1]	Blackstone,	42 McClellan Street.
Binks, Frank Joseph,[1]	Maynard,	29 North Prospect Street.
Bolster, Rolfe Nelson,[1]	Worcester,	15 Phillips Street.
Boyd, Robert Lucius,[1]	Lynn,	Kappa Gamma Phi.
Brigham, Sylvia Bowen,	Newtonville,	Draper Hall.
Brown, Robert Edward,[1]	Sharon,	36 North Prospect Street.
Bruce, Walter Griffith,	Springfield,	21 Fearing Street.
Burtch, Chester Swan,	Hopkinton,	77 Pleasant Street.
Cameron, Walter Leslie,	Palmer,	66 Pleasant Street.
Canlett, Franklin Harwood,	Bedford,	28 Northampton Road.
Capen, Howard Boyden,	Canton,	Brooks Farm,
Carlson, Fred Albert,	Pittsfield,	84 Pleasant Street.
Carter, Thomas Edward,	West Andover,	Brooks Farm.
Chambers, Roger James,	Dorchester,	6 Nutting Avenue.
Chapman, John Alden,	Salem,	83 Pleasant Street.
Chefferds, Louis David,	Worcester,	1 South College.
Clapp, Roger Francis,	Salem,	17 Phillips Street.
Clark, Stewart Sandy,[1]	Holyoke,	5 Nutting Avenue.
Davis, Dwight Shaw,	Ayer,	31 East Pleasant Street.
Drummond, Joseph Lawrence,[1]	Holyoke,	4 Chestnut Street.
Dubois, George Arthur,	Fall River,	17 Fearing Street.
Duncan, George James,	Arlington,	3 Nutting Avenue.
Durfee, Norman Owen,[1]	Fall River,	79 Pleasant Street.
Edes, David Oliver Nourse,	Bolton,	35 East Pleasant Street.
Ellis, Ralph Chick,[1]	West Newton,	6 Phillips Street.
Emmerich, Louis Philip,	Paterson, N. J.,	Mount Pleasant.
Erickson, George Edwin,	Brockton,	21 Fearing Street.
Faber, Edward Stuart,	Plainfield, N. J.,	Care of S. J. Wright.
Fairchild, Robert Dunning,	Newtown, Conn.,	30 North Prospect Street.
Faneuf, Leo Joseph,	West Warren,	Brooks Farm.
Farrar, Delwin Bruce,	Amherst,	1 Dana Street.
Fellows, Harold Carter,	Peabody,	6 Phillips Street.
Ferriss, Samuel Boynton,	New Milford, Conn.,	4 Chestnut Street.
Fletcher, Walter Greene,	Newton,	53 Lincoln Avenue.
Foley, William Albert,	Palmer,	35 North Prospect Street.
Foster, Hamilton Knight,	New Rochelle, N. Y.,	24 Beston Street.
Foster, Roy Wentworth,	Lynn,	56 North Pleasant Street.
Frellick, Arthur Lester,	Everett,	17 Phillips Street.
Fuller, Camille Baldwin,	West Quincy,	17 Phillips Street.
Garvey, Mary Ellen Monica,	Amherst,	27 South Prospect Street.
Gasser, Thomas Jefferson,	Uxbridge,	Care of Professor Morton.
Gifford, Flavel Mayhew,	West Tisbury,	6 Nutting Avenue.
Gilbert, Howard Goodwin,[1]	Beverly,	15 Hallock Street.
Gillette, Nathan Warner,	Revere,	35 East Pleasant Street.
Goodridge, George Lucien,	Melrose,	53 Lincoln Avenue.
Goodwin, William Irving,	Haverhill,	Brooks Farm.

[1] Work incomplete.

Gordon, Frederick George,	Plymouth,	Care of Mrs. Taber, North Amherst.
Grayson, Forrest,	Milford,	Care of Professor Morton.
Haines, Foster Kingsley,	Peabody,	7 Nutting Avenue.
Hance, Forrest Sansbury,	Paterson, N. J.,	Care of Mr. Whittier, Mount Pleasant.
Harwood, Ralph Wallace,	Barre,	66 Pleasant Street.
Hawley, Robert Dorman,	Springfield,	15 Phillips Street.
Higgins, Leo Clement,	Amesbury,	116 Pleasant Street.
Holmes, George Frederick,[1]	Ipswich,	60 Pleasant Street.
Holmes, Robert Palmer,	Wakefield,	Brooks Farm.
Howard, Arthur Merchant,	Pittsfield,	84 Pleasant Street.
Howe, Albert Edward,[1]	Needham,	3 Phillips Street.
Howe, George Cole,	Worcester,	Care of Professor Morton.
Howes, Donald Francis,	Ashfield,	Brooks Farm.
Hunnewell, Paul Fiske,[1]	West Somerville,	13 Phillips Street.
Huntoon, Douglas Henderson,	Norwood,	7 Nutting Avenue.
Hurlburt, Ralph Walter,[1]	Ashley Falls,	94 Pleasant Street.
Ingalls, Irving Weaver,	Brooklyn, N. Y.,	21 Fearing Street.
Irvine, Robert Patterson,	Wilmette, Ill.,	60 Pleasant Street.
Jenks, Albert George,[1]	Norton,	12 Cottage Street.
Johnson, Birger Lars,	Dorchester,	29 McClellan Street.
Johnson, Sidney Clarence,	Gloucester,	13 Phillips Street.
Jones, Forrest Dean,	Worcester,	120 Pleasant Street.
Jones, Harold Ellis,	New Canaan, Conn.,	Care of E. F. Gaskill.
Jones, Leon Dudley,	Worcester,	120 Pleasant Street.
Kennedy, Carl Francis,[1]	Milford,	Care of Professor Morton.
Kirkham, Philip Leffingwell,[1]	Springfield,	7 Nutting Avenue.
Knight, Frank Edward,[1]	Brimfield,	58 North Pleasant Street.
Lanphear, Marshall Olin,	Windsor, Conn.,	35 East Pleasant Street.
Lasker, David,	Hyde Park,	38 Cottage Street.
Lawrence, Lewis Henry,	Falmouth,	83 Pleasant Street.
Lawton, Ralph Wilber,[1]	Fall River,	75 Pleasant Street.
Leiper, McCarrell Hudson,	Blauvelt, N. Y.,	116 Pleasant Street.
Levine, Darwin Solomon,	Sherborn,	38 Cottage Street.
Lipshires, David Mathew,	Winter Hill,	14 Nutting Avenue.
Loring, William Rupert,	Housatonic,	94 Pleasant Street.
Lusk, John Isaiah,	Marlborough,	7 High Street.
Lyons, Louis Martin,	Norwell,	29 North Prospect Street.
Maginnis, John Joseph,	Lawrence,	35 North Prospect Street.
Mallorey, Alfred Sidney,	Lynn,	15 Hallock Street.
Marshall, Max Skidmore,	Amherst,	44 Sunset Avenue.
Mather, William,	Amherst,	Fitts House.
McClellan, Adams Newton,[1]	Keene, N. H.,	35 East Pleasant Street.
McKechnie, Donald,	Sharon,	Brooks Farm.
McKee, William Henry,	Chelsea,	Brooks Farm.
Messenger, Kenneth Leroy,	Winsted, Conn.,	35 East Pleasant Street.
Millard, Harold Baldwin,	Great Barrington,	5A East Pleasant Street.
Minor, John Bacon, Jr.,	Plainville, Conn.,	79 Pleasant Street.
Mitchell, Edward Nahum,	Medford,	36 North Prospect Street.
Mitchell, Theodore Bertis,	Needham,	Brooks Farm.
Mower, Carl Taft,	Montpelier, Vt.,	35 East Pleasant Street.
Newton, Edward Buckland,	Holyoke,	5 Nutting Avenue.
Newton, Gaylord Arthur,	Durnham, Conn.,	3 Fearing Street.
Norcross, Gardner Clyde,	Brimfield,	58 North Pleasant Street.
Odams, Lester Nichols,[1]	Salem,	120 Pleasant Street.
O'Neill, Oliver Maurice,	Dorchester,	16 Pleasant Street.
Patch, Lawrence Henry,	Wenham,	120 Pleasant Street.
Petit, Arthur Victor,	Amherst,	31 East Pleasant Street.
Phipps, Clarence Ritchie,	Dorchester,	77 Pleasant Street.
Powell, James Congdon,	Newport, R. I.,	77 Pleasant Street.
Pratt, Oliver Goodell,	Salem,	17 Phillips Street.

[1] Work incomplete.

Preble, John Nelson,	Jamaica Plain,	42 McClellan Street.
Randall, Waring Eugene,[1]	Belchertown,	Belchertown.
Raymond, Clinton Rufus,	Beverly,	35 North Prospect Street.
Reumann, Theodore Henry,	New Bedford,	31 East Pleasant Street.
Richardson, Stephen Morse,	Marlborough,	South College.
Robbins, Waldo Whiting,	Hingham,	53 Lincoln Avenue.
Roberts, Oliver Cousens,	Boston,	36 North Prospect Street.
Robinson, William Herbert,	Lynn,	56 North Prospect Street.
Russell, Howard Leigh,	Worcester,	116 Pleasant Street.
St. George, Raymond Alexander,	Lynn,	15 Hallock Street.
Sampson, Fred Bucknam,[1]	Fall River,	60 North Pleasant Street.
Sanborn, Deane Waldron,	Nantucket,	Care of S. J. Wright.
Sawyer, Wesley Stevens,	Boston,	42 McClellan Street.
Sawyer, William George,	Berlin,	Care of S. J. Wright.
Schlough, George Homer,	Waltham,	31 East Pleasant Street.
Seavey, Arthur Jones,	New Braintree,	Pease Avenue.
Sedgwick, Alfred,[1]	Fall River,	116 Pleasant Street.
Sliski, John,	Springfield,	– –
Smith, Carleton Tower,	West Newton,	116 Pleasant Street.
Smith, Sidney Sumner,	Boston,	32 North Prospect Street.
Spaulding, Lewis Winans,[1]	South Hingham,	Care of Professor Morton.
Spencer, Arthur Winthrop,	Danvers,	12 Cottage Street.
Stanton, Frank Parker,	Revere,	35 East Pleasant Street.
Stickney, Stephen Arthur,	West Peabody,	7 Nutting Avenue.
Stowe, Raymond Timothy,	Enfield, Conn.,	35 East Pleasant Street.
Stowers, Addison Clifford,	Dorchester,	15 Phillips Street.
Strong, William Perkins,[1]	South Hadley Falls,	Pine Street, North Amherst.
Sullivan, Harold Leo,	Lawrence,	35 North Prospect Street.
Sutherland, Ralph,	Cambridge,	77 Pleasant Street.
Swift, Hubbard,	West Falmouth,	83 Pleasant Street.
Thayer, Weston Cushing,	Hingham,	53 Lincoln Avenue.
Thompson, Wells Nash,	Adams,	79 Pleasant Street.
Thorpe, Richard Warren,	West Medford,	17 Cottage Street.
Tilton, Arthur Dana,	Wellesley,	15 Phillips Street.
Tucker, Lee Heston,	Ware,	8 North College.
Underwood, Arthur Leslie,	Stow,	35 East Pleasant Street.
vanAlstyne, Lewis Morrell,	Kinderhook, N. Y.,	35 East Pleasant Street.
Vickers, John,	Deerfield,	36 North Prospect Street.
Warren, Wesley Raymond,	Worcester,	15 Phillips Street.
Weeks, Roger Wolcott,	Hyde Park,	35 East Pleasant Street.
Wilbur, Laurence Weston,	South Middleborough,	23 East Pleasant Street.
Willoughby, Raymond Royce,	Newtington, Conn.,	24 Beston Street.
Wolfson, Louis Elijah,	Malden,	38 Cottage Street.
Woodbury, Ray Willard,[1]	Newburyport,	Care of H. G. Russell, Cottage Street.
Wooding, Paul Bennett,[1]	Yalesville, Conn.,	35 East Pleasant Street.
Woods, Frank Archibald,	Groton,	5 Nutting Avenue.
Woodworth, Brooks,	Lowell,	6 Nutting Avenue.
Worthley, Harlan Noyes,	Greenwood,	14 Nutting Avenue.
Wright, John Lindsey,[1]	Putnam, Conn.,	77 Pleasant Street.
Yesair, John,	Byfield,	36 North Prospect Street.

UNCLASSIFIED STUDENTS.

Brawn, Howard Drown,	Mansfield,	32 North Prospect Street.
Derby, Llewellyn Light,	Hudson,	35 East Pleasant Street.
Dillon, Thomas Stevenson,[1]	West Warren,	35 East Pleasant Street.
Fellows, Katharine Adelheid,	Northampton,	21 Amity Street.
Floyd, Fred Gillan,	West Roxbury,	9 Fearing Street.
Fraser, Charles Allen,	Plymouth,	35 East Pleasant Street.
Hartwell, Herford Carter,	Somerville,	75 Pleasant Street.
Higgins, Lloyd Hale,	Provincetown,	31 North Prospect Street.

[1] Work incomplete.

Hill, Donald Russell,	Arlington,	29 McClellan Street.
Leonard, Nelson Ellsworth,	Raynham Center,	30 North Prospect Street.
Lindsley, Horace Nelson,[1]	Orange, N. J.,	120 Pleasant Street.
Lydiard, Carl Harold,	Boston,	3 Phillips Street.
Martin, Thomas James,	Holyoke,	60 Pleasant Street.
McLean, George Robert,	Northampton,	60 Washington Avenue, Northampton.
McMurray, Charles Joseph,	West Fitchburg,	42 McClellan Street.
McNamara, Michael Joseph,	Stoughton,	35 East Pleasant Street.
Mooradkanian, Gregory,	Lawrence,	Hillside Avenue, R. F. D. No. 126.
Murrin, James Patrick,	Dorchester,	79 Pleasant Street.
Newton, Raymond Lovejoy,[1]	Malden,	29 McClellan Street.
O'Brien, Patrick,	Pittsfield,	60 Pleasant Street.
Parker, Judson Lanphere,	Holyoke,	56 North Pleasant Street.
Pierce, Harry Walker,	West Medford,	3 McClellan Street.
Richardson, Royal Phelps,	Scituate,	29 McClellan Street.
Robinson, Edward Hosmer,	Malden,	3 McClellan Street.
Rugg, Arthur Prentice, Jr.,	Worcester,	Care of Professor Morton.
Russell, Edward Stanton,	New Haven, Conn.,	73 Pleasant Street.
Studley, Robert Allan,	Rockland,	116 Pleasant Street.
Talbot, Marjorie,	Roxbury,	9 Phillips Street.
Tuttle, George Raymond,	Waltham,	Care of E. F. Gaskill.
Upham, Harlan Willis,[1]	Thornton's Ferry, N. H.,	8 Allen Street.
Winchester, George Taylor,	Woburn,	75 Pleasant Street.
Winter, Henry George,[1]	Ashburnham,	120 Pleasant Street.

Summary by Classes.

Graduate students,	52
Senior class,	103
Junior class,	113
Sophomore class,	142
Freshman class,	168
Unclassified students,	32
Total registration,	610

Geographical Summary.

Massachusetts,	500
Connecticut,	35
New York,	24
New Jersey,	10
Pennsylvania,	6
New Hampshire,	6
Maine,	5
Vermont,	5
Ohio,	3
Rhode Island,	3
Canada,	2
Barbados,	1
China,	1
Delaware,	1
Illinois,	1
India,	1
Japan,	1
Michigan,	1
South America,	1
Virginia,	1
Wisconsin,	1
Wyoming,	1
Total,	610

[1] Work incomplete.

Short Course Students.

The Ten Weeks' Course.

Adams, Henry L.,	Elmwood.
Alstrom, Edwin H.,	Springfield.
Anderson, Mrs. Ernest,	Amherst.
Armstrong, Anna W.,	East Sandwich.
Atwell, Lewis,	South Framingham.
Bacon, R. D.,	Worcester.
Barker, Harry S.,	Littleton.
Barnard, F.,	Northampton.
Barnes, James,	Yalesville, Conn.
Beckwith, Wm.,	Springfield, Vt.
Bemis, Ralph A.,	Spencer.
Bliss, Walter C.,	Springfield.
Borden, Aubrey W.,	South Framingham.
Botsford, H. E.,	Petersham.
Boynton, Paul J.,	Ausable Forks, N. Y.
Bradford, Clarendon A.,	North Dorset, Vt.
Bridgman, Gertrude L.,	South Amherst.
Brown, Mrs. M. W.,	Windsor.
Bronson, Wesley H.,	Marlborough.
Bryan, Bart E.,	West New Brighton, N. Y.
Buck, Edgar H.,	Warren.
Burnham, William I.,	Lexington.
Burns, James J.,	Meriden, Conn.
Buswell, Elmer N.,	Boston.
Butterfield, Lawrence D.,	Lexington.
Buxton, Ralph O.,	Saugus.
Carroll, A. Sidney,	Hartford, Conn.
Cathie, Harold,	Needham.
Chase, Mrs. Clara,	Greenfield.
Chase, Harry E.,	South Framingham.
Clark, Jesse H.,	Malden.
Clarke, Stanley,	Winchester.
Clarke, Mrs. Stanley,	Winchester.
Coe, Ernest A.,	Greenwich, Conn.
Copeland, Robert A.,	Townsend.
Coppinger, Edward,	Needham Heights.
Corey, Eben Fox,	Boston.
Cotter, William,	Salem.
Creesy, Richard L.,	Brookline.
Cresta, Nicholas,	Haydenville.
Cunningham, John A.,	Dorchester.
Curley, John I.,	Holyoke.
Cushman, Burt A.,	Bernardston.
Cushman, R. F.,	Sylvania, O.
Cutler, Paul E.,	Boylston.
Dana, Alfred L.,	Amherst.
Dascomb, Jean,	Westminster, Vt.
Davis, P. I.,	Chestnut Hill.
Dawson, Harry Custer,	Tewksbury.
Diaz, Mrs. Ralph M.,	Belmont.
Diaz, Ralph M.,	Belmont.

Dickinson, Richard S.,	Granville.
Dickinson, W. L.,	Helena, Mont.
Dimock, Dwight L.,	Billerica.
Doten, Clarence A.,	Lincoln.
Ely, Ralph A.,	Holyoke.
Everson, Carroll W.,	Amherst.
Everson, Wesley E.,	West Hanover.
Farrar, Marion A.,	South Framingham.
Fellows, Katharine A.,	Northampton.
Fisher, Austin L.,	North Amherst.
Fiske, Wm. M.,	Northampton.
Fitton, Willard S.,	Dorchester.
Flagg, E. M.,	Florence.
Foster, Charles H.,	North Andover.
Frye, Caleb B.,	Dorchester.
Gale, Lawrence S.,	Charlemont.
Gifford, J. E.,	Danvers.
Glazier, H. E.,	Andover.
Gordon, Harrington M.,	Auburndale.
Graves, Charles E.,	Haydenville.
Green, H. L., Jr.,	Worcester.
Greenwood, L. J.,	Billerica.
Gregson, B. N.,	Boston.
Harthan, Harold C.,	West Boylston.
Hastings, M. Leroy,	Whitinsville.
Hawks, Paul,	Deerfield.
Hayden, Luman H.,	Hudson.
Heald, Philip C.,	Greenville, N. H.
Hemenway, C. M.,	Williamsburg.
Herrick, Clifton H.,	Raynham.
Herrick, Frank L.,	Brookline.
Higgins, Edward L.,	North Billerica.
Hinman, Wilbur S.,	Bennington, Vt.
Holden, Lester,	Shirley.
Holmes, Arthur C.,	Kingston.
Hopkins, Chas. Warner,	Brattleboro, Vt.
Howe, Harold H.,	Kingston.
Hunter, R. D.,	West Claremont, N. H.
Hopkinson, H. B.,	Cambridge.
Irons, Marion R.,	Boston.
Keith, Russell S.,	East Bridgewater.
Kenyon, S. W.,	New Bedford.
Killam, John,	East Boxford.
Klang, M. I.,	East Canaan, Conn.
Lathrop, Benson M.,	Pittsfield.
Lefevre, Herbert T.,	Jamaica Plain.
Lehr, F. L., Jr.,	New Haven, Conn.
Le Provost, Lyle F.,	Lee.
Littlefield, Ray Leon,	Auburn.
Lorion, E. H.,	Worcester.
Lyons, Thomas E.,	Worcester.
Martin, Ralph,	Montague.
Merrell, Charles E.,	West Somerville.
Merrell, Ralph,	Suffield, Conn.
Milk, Mrs. M. E.,	South Amherst.
Miller, Donald H.,	Whitman.
Mumford, W. C.,	Springfield.
Newhall, Hermann A.,	Sterling Junction.
Nicholls, Raymond F.,	Northampton.
Norrman, Karl A.,	Lynn.
O'Donnell, Ambrose,	Jamaica Plain.
O'Donnell, J. C.,	Belchertown.
Parsons, Earle M.,	Northampton.
Parsonson, Alfred H.,	Peabody.

Partridge, Francis A., Jr.,	Woburn.
Pearmain, John D.,	Framingham.
Platt, Clarence I.,	Milford, Conn.
Post, Charles L.,	Great Barrington.
Potter, Roger W.,	Worcester.
Putney, Luther R.,	Marblehead.
Record, Harold J.,	West Boylston.
Rich, Alton F.,	Winthrop.
Rooney, Nelson L.,	Bedford.
Ropes, Ernest C.,	Boston.
Ropes, Mrs. Nathalie W.,	Boston.
Roundy, Perley B.,	Beverly.
Russell, Ivo A.,	Concord Junction.
Russell, Raymond M.,	Quincy.
Russell, Mrs. Renouf,	Keene, N. H.
Russell, Renouf,	Keene, N. H.
Sanders, Eugene,	Wollaston.
Sandford, Geo. T.,	Plattsburg, N. Y.
Sanford, Raymond,	Plattsburg, N. Y.
Sawyer, Henry A.,	Worcester.
Scott, Keith,	Brookline.
Shaw, W. F.,	Orange.
Siech, P. H.,	Springfield.
Silk, Jack,	Lowell.
Sinclair, Harrop S.,	Northampton.
Skillings, Mrs. D. U.,	Amherst.
Smith, Allison P.,	Cambridge.
Smith, Bowdoin B.,	East Weymouth.
Snoji, Shiina,	Japan.
Snyder, Henry H.,	Cummington.
Stentiford, Henry,	Irvington, N. Y.
Stevens, Edward Reed,	Worcester.
Stiles, Lawrence,	Amherst.
Stone, Frederick T.,	Chelsea.
Stoughton, Philip,	Montague.
Sussmann, Rudolph,	Sharon.
Talty, T. L.,	Boston.
Tappan, Cushing,	Cambridge.
Teplenke, I.,	Raynham Center.
Thornburg, Paul,	Ashland, O.
Tinkham, W. Earle,	North Raynham.
Totman, William,	Bardwell's Ferry.
Trull, Larkin T., Jr.,	Lowell.
Turner, Miss A. C.,	Quincy, Ill.
Turner, Ralph C.,	Amherst.
Tyler, John,	Brookline.
Tyler, Mrs. John,	Brookline.
Urbaitis, Frank,	Worcester.
Van Valkenburgh, Hugh,	State Line.
Veprek, Vencenc,	Springfield.
Wade, Francis C.,	West Newbury.
Walker, Henry P.,	Hudson.
Walsh, Henry J.,	Kingston.
Walsh, Lloyd,	Amherst.
Wells, Collin,	Hanover, N. H.
Wendel, Mrs. Theodore,	Ipswich.
Whitlock, Aaron B.,	Warehouse Point, Conn.
Whitman, Frank L.,	Griswoldville.
Wilbur, W. A.,	Lanesborough.
Wilcox, Ralph Henry,	Middletown, Conn.
Willard, Winn,	Cambridge.
Williams, G. R.,	Northampton.
Wilson, Harry C.,	East Lynn.
Wood, Charles A.,	Central Village.

Wood, Oliver W.,	Arlington.
Yale, David H.,	Meriden, Conn.
Young, Harold B.,	Yalesville, Conn.

Apple Packing School.

Anderson, O. G.,	East Pepperell.
Bagnell, Fred,	Mount Hermon.
Barnard, Perley D.,	Contoocook, N. H.
Barnard, Raymond J.,	Contoocook, N. H.
Barton, Hubert C.,	South Amherst.
Burke, E. J.,	Hadley.
Castle, F. A.,	Springfield.
Chase, Edith E.,	Stuyvesant, N. Y.
Chase, H. W.,	Cambridge.
Churchill, Mrs. W. W.,	Milton.
Clarke, Lulu E.,	Milton, N. Y.
Davis, Irving G.,	Brimfield.
Doolittle, Albert W.,	Concord Junction.
Elder, David,	Northampton.
Ely, Ralph,	Holyoke.
Frost, H. I.,	Ashby.
Hall, Russell B.,	Medway.
Hulst, Alfred N.,	Amherst.
Leach, C. Arthur,	South Hamilton.
Lindstrom, Mrs. C. R.,	Fayville.
Neall, N. J.,	Boston.
Parker, Chas. M.,	Brookfield.
Porter, Wm. J.,	Groton.
Powers, Frank A.,	Bolton.
Ryan, John C.,	Bennington, Vt.
Taber, L. I.,	Mount Hermon.
Taplin, W. H.,	Brighton.
Whitelock, Wm. M. E.,	Marlborough.

School for Tree Wardens.

Ames, John S.,	North Easton.
Ball, L. P.,	Winchendon.
Benoit, Piesee,	Southbridge.
Brown, Penwal S.,	Scituate.
Bragg, J. W.,	Greenfield.
Bray, Thomas A.,	Holyoke.
Brown, John W.,	Brimfield.
Colton, Wm. W.,	Fitchburg.
Dodge, A. W., Jr.,	Wenham.
Gibbs, R. M.,	Salem.
Hale, Warren F.,	Salem.
Jones, Martin A.,	Northfield.
McCullough, John J.,	Melrose.
McLaughlin, J. H.,	Millers Falls.
Neale, Harold J.,	Worcester.
O'Connell, M. H.,	Millers Falls.
Riley, E. E.,	Needham.
Rust, C. N.,	Granby.
Sawtelle, B. A.,	Greenwich.
Taplin, W. H.,	Brighton.
Whitney, Geo. A.,	Athol.
Worth, Herbert J.,	Gloucester.

Summer School.

Allanbrook, Mabel C.,	Everett.
Avery, Roy C.,	Storrs, Conn.
Ayer, Addie M.,	Richford, Vt.

Armstrong, Mrs. L. V. V.,	Bronxville, N. Y.
Backus, Victor T.,	Center Marshfield.
Baker, Helen L.,	Wollaston.
Ballow, Jessica E.,	Enfield.
Berry, James M.,	Everett.
Beston, Mary,	Amherst.
Billings, Mary A.,	Amherst.
Blanchard, Winifred V.,	Roxbury.
Borleughi, Louis,	South Weymouth.
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Bradley, Parker R.,	Amherst.
Bridgman, Marion E.,	Amherst.
Bradbeck, Paul E.,	Wollaston.
Brooks, Alice O.,	Quincy.
Brooks, Laura J.,	Stoneham.
Bryant, Bertha W.,	Woburn.
Burnap, Margaret,	Woburn.
Burns, Thorton,	Plymouth.
Buswell, Marion E.,	Dorchester.
Capen, Arthur G.,	Worthington.
Cattanach, Henrietta C.,	Boston.
Challiss, Ada L.,	Bronxville, N. Y.
Chamberlain, Edwin M.,	Amherst.
Chamberlain, Mrs. Mary B.,	Amherst.
Chandler, Lorna M.,	Amherst.
Churchill, Josephine,	Ponkapog.
Clark, Katherine,	North Amherst.
Clark, Mary,	Amherst.
Cooke, Grace H.,	New Haven, Conn.
Cooley, Elsie H.,	Amherst.
Davis, Isabel,	Princeton.
Davis, Malcolm W.,	New York City.
Davis, Rufus E.,	Brockton.
Dawson, Ava B.,	Boston.
Dawson, Una G.,	Boston.
Demond, Grace,	Chicopee Falls.
Dorr, Thomas R.,	Williamstown.
Dyer, Vivian,	Auburndale.
Elwell, Mrs. Sybil M.,	Winthrop.
Emanuel, Max.,	New York City.
Epstein, Ida A.,	Amherst.
Epstein, Rose,	Amherst.
Evans, Augusta D.,	Frackville, Pa.
Farrell, Mrs. Helen W.,	Stoughton.
Fauntleroy, Anne M.,	Northampton.
Fay, Charles R.,	Brooklyn, N. Y.
Fernald, Evelyn I.,	Groton.
Flagg, Sadie E.,	West Berlin.
Floyd, F. G.,	West Roxbury.
Floyd, Mrs. F. G.,	West Roxbury.
Fuller, Gertrude A.,	Boston.
Gates, Ruth D.,	Amherst.
Grant, Winnifred L.,	North Attleborough.
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Hall, M. Elizabeth,	Amherst.
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Harrison, Mrs. A. K.,	Amherst.
Hatch, Bertha E.,	New Milford.
Hatch, Mary J.,	New Milford.
Hearn, Geo. D.,	Holyoke.
Henry, Margaret Lee,	Norwalk, Conn.
Hickey, Nellie M.,	Sunderland.
Holden, Mrs. Austin,	Boston.
Homor, Eleanor J.,	Stoughton.

Hopkins, Lydia L.,	Leominster.
Howard, Alice M.,	North Amherst.
Howard, Clara B.,	North Amherst.
Hoyt, Mrs. Laura A.,	Greenfield.
Hurd, Mrs. W. D.,	Amherst.
Jacobs, Anita A.,	Greenwich, Conn.
James, Edith,	Montclair, N. J.
Johns, Lois,	Amherst.
Johnson, Phyllis,	Amherst.
Joslin, Miss J. M.,	New York City.
Kelsey, Christina,	West Hartford, Conn.
Kendall, Harley F.,	Springfield.
Kennedy, H. Anna,	South Weymouth.
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Knowles, Grace Vincent,	Natick.
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Lockwood, Julia B.,	Norwalk, Conn.
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Marley, Edna,	Cymryd, Pa.
Mathews, Maud A.,	Fall River.
Maynard, Pearl A.,	West Newton.
Merriam, Ida A.,	Malden.
Middleton, Frederick H.,	Amherst.
Mitchell, Edward A.,	Coppahosic, Va.
Moore, Mary A.,	West Haven, Conn.
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McGuire, Helena M.,	Belmont.
McLean, Geo. R.,	Northampton.
Nickerson, Charlotte W.,	Amherst.
Onthank, Charlotte,	Roxbury.
Partridge, Nelson H., Jr.,	Cambridge.
Patterson, Philip M.,	Springfield.
Phelps, Lyman B.,	Northampton.
Richards, Clinton J.,	Northampton.
Richmond, Florence M.,	Meriden, Conn.
Ruggli, Clara W.,	Cambridge.
Russell, Gladys,	Amherst.
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Samuel, Elizabeth I.,	Boston.
Sayward, Dorothy R.,	Wollaston.
Schweetzer, Edith E.,	Jamaica Plain.
Schweetzer, Walter,	Jamaica Plain.
Scott, Leslie J.,	Amesbury.
Sears, Mrs. F. C.,	Amherst.
Shaw, Mrs. Bertha T.,	Amherst.
Shearman, Janet C.,	Williamstown.
Sheldon, Ernest M.,	Amherst.
Sheridan, Katherine,	Winchester.
Sheridan, Mrs. G. F.,	Winchester.
Sherman, Roger,	Detroit, Mich.
Smith, Atherton C.,	East Boston.
Smith, Clara N.,	North Amherst.
Smith, Mrs. G. R.,	East Boston.
Smith, Stanley W.,	Boston.
Spencer, Elizabeth,	Bridgeport, Conn.
Spencer, Jessie,	Bridgeport, Conn.
Spencer, Mabel,	Bridgeport, Conn.
Stebbins, Blanche,	Lexington.
Stedman, Geo. A.,	Taunton.

Sullivan, Nellie,	Three Rivers.
Sagickian, John,	East Lynn.
Turner, Mary I.,	South Meriden, Conn.
Unangst, Royal L.,	Hingham.
Waid, Mrs. E. D.,	Amherst.
Walcott, John,	Concord.
Walker, Mrs. L. S.,	Amherst.
Waugh, Edith L.,	Brockton.
Weeks, Gertrude,	Boston.
Welch, Elizabeth A.,	Fall River.
Wheeler, Ethel M.,	Bridgeport, Conn.
Whitely, Ethel C.,	Philadelphia, Pa.
Wheeler, Ethel M.,	Bridgeport, Conn.
Wiggin, Mary P.,	Winchester.
Wright, Stuart E.,	Taunton.
Wright, Elizabeth,	Northampton.

School for Rural Social Service.

Adams, Rev. Raymond,	North Brookfield.
Allen, George E.,	Wendell.
Bottume, Hazel E.,	Windsor Locks, Conn.
Callahan, Julia F.,	Lynn.
Curry, Katherine,	Lynn.
Damon, Geo. H.,	Windsor.
Foster, Rev. E. O.,	Columbia, Conn.
Griffin, J. L.,	Corvallis, Ore.
Hardy, Rev. Owen E.,	North Hadley.
Hawk, Rev. Willis B.,	South Barre.
Howard, E. F.,	East Northfield.
Kebbe, David L.,	Cummington.
Loomis, Herbert N.,	Northampton.
Luce, Robert W.,	Seymour, Conn.
Panunzio, Constantine M.,	Amherst.
Pratt, Rev. Hermann J.,	Granville.
Percy, Rev. C. L.,	Charlton.
Pines, J. Franklin,	Springfield.
Selden, Ruth,	Northampton.
Smith, John F.,	Berea, Ky.
Webb, Daisy,	Amherst.
Willett, A. D.,	Hubbardston.

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AMHERST, MASS.

Vol. VIII. No. 1. For January, 1916

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Jan., Feb., Mar., May, Sept., Oct.

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Public Document No. 31

CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE, 1915-1916.

FIFTY-THIRD ANNUAL REPORT.

PART II.

BOSTON:

WRIGHT & POTTER PRINTING CO., STATE PRINTERS,

32 DERNE STREET.

1916.

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1915-1916.



BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1916.

NATIONAL MUSEUM

Approved by
The State Board of Publication.

The Massachusetts Agricultural College.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow. Additional announcements are made in a supplementary bulletin, published in the spring. Beginning September, 1916, the work of the college will be given in four terms instead of two semesters; full announcements will appear in the spring supplement.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue. Special publication will be made should it become necessary on account of important changes.

Calendar.

1916-17.

Regular Courses.

1916.

January 3, Monday, 1 P.M.,	Winter recess ends; regular schedule of classes.
February 7, Monday, 1 P.M.,	Second semester begins; regular schedule of classes.
February 22, Tuesday afternoon,	Half holiday, Washington's Birthday.
March 24, Friday, 5 P.M.,	Spring recess begins.
April 3, Monday, 1 P.M.,	Spring recess ends; regular schedule of classes.
April 19, Wednesday afternoon,	Half holiday, Patriots' Day.
May 30, Tuesday,	Holiday, Memorial Day.
June 17–21, Saturday–Wednesday,	Commencement.
June 22–24, Thursday–Saturday,	Entrance examinations.
September 13–16, Wednesday–Saturday,	Entrance examinations.
September 20, Wednesday, 1.30 P.M.,	Fall term begins; chapel.
October 12, Thursday afternoon,	Half holiday, Columbus Day.
November 29, Wednesday, 12 M.–Friday, December 1, 1 P.M.,	Thanksgiving recess.
December 15, Friday, 5 P.M.,	Winter term closes; Christmas recess begins.

1917.

January 1, Monday, 1 P.M.,	Christmas recess ends; winter term begins.
February 22, Thursday afternoon,	Half holiday, Washington's Birthday.
March 23, Friday, 5 P.M.,	Winter term closes; spring recess begins.
April 2, Monday, 1 P.M.,	Spring recess ends; spring term begins.
April 19, Thursday afternoon,	Half holiday, Patriots' Day.
May 30, Wednesday,	Holiday, Memorial Day.
June 23–27, Saturday–Wednesday,	Commencement.
June 27, Wednesday,	Spring term ends.
July 2, Monday,	Summer term begins.

Massachusetts Agricultural College.

History. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of nearly all the buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the Federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the Federal station, and subsequently the whole was incorporated with the college.

Courses. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-year[1] course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science, doctor of philosophy and master of agriculture. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and summer school. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, educational exhibits, lecture courses, demonstrations and circulating libraries.

Purpose of the College. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences

[1] Twenty-seven teaching departments offer instruction in agriculture, horticulture, sciences, the humanities and rural social science. A system of major courses permits a student to elect major work in 1 of 16 departments, specializing in that and allied subjects for a period of two years.

underlying the great agricultural industry, for teaching in agricultural colleges and high schools, for scientific experts in chemistry, entomology, botany and microbiology and for business operations having connection with practical agriculture.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, botany and zoölogy, are an essential preparation. Still other students find the course a desirable education, without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which a major course is offered.

Location and Equipment. — The agricultural college is located in the town of Amherst. The grounds comprise more than 600 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

The Massachusetts Agricultural Experiment Station.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was then without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college, and was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about one-third of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to a committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, experimentation and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

THE CORPORATION.

ORGANIZATION OF 1915.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
ARTHUR G. POLLARD of Lowell,	1916
CHARLES A. GLEASON of New Braintree,	1916
FRANK GERRETT of Greenfield,	1917
HAROLD L. FROST of Arlington,	1917
CHARLES H. PRESTON of Danvers,	1918
FRANK A. HOSMER of Amherst,	1918
DAVIS R. DEWEY of Cambridge,	1919
JOHN F. GANNON of Worcester,	1919
WILLIAM H. BOWKER of Concord,	1920
GEORGE H. ELLIS of West Newton,	1920
ELMER D. HOWE of Marlborough,	1921
EDMUND MORTIMER of Grafton,	1921
NATHANIEL I. BOWDITCH of Framingham,	1922
WILLIAM WHEELER of Concord,	1922

MEMBERS EX OFFICIO.

His Excellency Governor DAVID I. WALSH, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
DAVID SNEDDEN, *State Commissioner of Education.*
WILFRID WHEELER, *Secretary of the State Board of Agriculture.*

OFFICERS OF THE CORPORATION.

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CHARLES A. GLEASON of New Braintree, *Vice-President.*
WILFRID WHEELER of Concord, *Secretary.*
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CHARLES A. GLEASON of New Braintree, *Auditor.*

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GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
FRANK A. HOSMER.
EDMUND MORTIMER.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, *Chairman.*
WILLIAM H. BOWKER.
FRANK A. HOSMER.
DAVID SNEDDEN.
ELMER D. HOWE.
DAVIS R. DEWEY.
JOHN F. GANNON.

Committee on Farm.

NATHANIEL I. BOWDITCH, *Chairman.*
FRANK GERRETT.
CHARLES A. GLEASON.
GEORGE H. ELLIS.

[1] The president of the college is ex officio member and secretary of standing committees.

Committee on Horticulture.

HAROLD L. FROST, *Chairman.*
EDMUND MORTIMER.
ELMER D. HOWE.
WILFRID WHEELER.

Committee on Experiment Department.[1]

CHARLES H. PRESTON, *Chairman.*
WILFRID WHEELER.
ARTHUR G. POLLARD.
HAROLD L. FROST.
EDMUND MORTIMER.

Committee on Buildings and Arrangement of Grounds.

WILLIAM H. BOWKER, *Chairman.*
WILLIAM WHEELER.
FRANK GERRETT.
CHARLES H. PRESTON.
GEORGE H. ELLIS.

Committee on Extension Service.

ELMER D. HOWE, *Chairman.*
GEORGE H. ELLIS.
HAROLD L. FROST.
DAVIS R. DEWEY.
WILFRID WHEELER.
JOHN F. GANNON.

Examining Committee of Overseers from the State Board of Agriculture.

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FRANK P. NEWKIRK of Easthampton.
WILLIAM E. PATRICK of Warren.
JOHN J. ERWIN of Wayland.
CHARLES W. FREEHAN, of Great Barrington.

ORGANIZATION OF 1916.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
FRANK GERRETT of Greenfield,	1917
HAROLD L. FROST of Arlington,	1917
CHARLES H. PRESTON of Danvers,	1918
FRANK A. HOSMER of Amherst,	1918
DAVIS R. DEWEY of Cambridge,	1919
JOHN F. GANNON of Worcester,	1919
ARTHUR G. POLLARD of Lowell,	1920
GEORGE H. ELLIS of West Newton,	1920
ELMER D. HOWE of Marlborough,	1921
EDMUND MORTIMER of Grafton,	1921
NATHANIEL I. BOWDITCH of Framingham,	1922
WILLIAM WHEELER of Concord,	1922
CHARLES A. GLEASON of New Braintree,	1923
JAMES F. BACON of Boston,	1923

MEMBERS EX OFFICIO.

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KENYON L. BUTTERFIELD, *President of the College.*
DAVID SNEDDEN, *State Commissioner of Education.*
WILFRID WHEELER, *Secretary of the State Board of Agriculture.*

OFFICERS OF THE CORPORATION.

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CHARLES A. GLEASON of New Braintree, *Vice-President.*
WILFRID WHEELER of Concord, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

[1] The director of the experiment station is a member of the committee on experiment department, without vote.

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Committee on Finance.

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GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
FRANK A. HOSMER.
EDMUND MORTIMER.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, *Chairman.*
FRANK A. HOSMER.
ELMER D. HOWE.
DAVID SNEDDEN.
DAVIS R. DEWEY.
JOHN F. GANNON.
JAMES A. BACON.

Committee on Farm.

NATHANIEL I. BOWDITCH, *Chairman.*
FRANK GERRETT.
GEORGE H. ELLIS.
EDMUND MORTIMER.

Committee on Horticulture.

HAROLD L. FROST, *Chairman.*
CHARLES A. GLEASON.
ELMER D. HOWE.
WILFRID WHEELER.

Committee on Experiment Department.

CHARLES H. PRESTON, *Chairman.*
WILFRID WHEELER.
ARTHUR G. POLLARD.
HAROLD L. FROST.
EDMUND MORTIMER.

Committee on Buildings and Arrangement of Grounds.

FRANK GERRETT, *Chairman.*
WILLIAM WHEELER.
CHARLES H. PRESTON.
GEORGE H. ELLIS.
JAMES F. BACON.

Committee on Extension Service.

ELMER D. HOWE, *Chairman.*
GEORGE H. ELLIS.
HAROLD L. FROST.
DAVIS R. DEWEY.
WILFRID WHEELER.
JOHN F. GANNON.

Examining Committee of Overseers from the State Board of Agriculture.

JOHN BURSLEY of West Barnstable.
FRANK P. NEWKIRK of Easthampton.
WILLIAM E. PATRICK of Warren.
JOHN J. ERWIN of Wayland.
CHARLES W. FREEHAN of Great Barrington.

Officers of the Institution.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

THE FACULTY.

Kenyon L. Butterfield, A.M., LL.D., ... President's House.
President of the College and Head of Division of Rural Social Science.

Charles H. Fernald, Ph.D., ... 3 Hallock Street.
Honorary Director of the Graduate School.

Edward M. Lewis, A.M., ... 19 Lincoln Avenue.
Dean of the College and Professor of Languages and Literature.

Fred C. Kenney, ... Mount Pleasant.
Treasurer of the College.

William P. Brooks, Ph.D., ... 6 Farview Way.
Director of the Experiment Station and Lecturer on Soil Fertility.

William D. Hurd, M.Agr., ... 46 Amity Street.
Director of the Extension Service and Supervisor of Short Courses.

Charles E. Marshall, Ph.D., ... 44 Sunset Avenue.
Director of the Graduate School and Professor of Microbiology.

Frank A. Waugh, M.Sc., ... Campus.
Head of Division of Horticulture and Professor of Landscape Gardening.

James A. Foord, M.Sc.Agr., ... 54 Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Administration.

Robert J. Sprague, Ph.D., ... Mount Pleasant.
Head of Division of Humanities and Professor of Economics and Sociology.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Goessmann Professor of Chemistry.

Charles Wellington, Ph.D., ... 34 Amity Street.
Professor of Chemistry.

James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science.

George E. Stone,[1] Ph.D., ... Mount Pleasant.
Professor of Botany.

Philip B. Hasbrouck, B.Sc., ... 130 Pleasant Street.
Registrar of the College and Professor of Physics.

John E. Ostrander, A.M., C.E., ... 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Professor of Entomology, Chairman of Division of Science.

Sidney B. Haskell, B.Sc., ... North Amherst.
Professor of Agronomy.

William R. Hart, A.M., L.B., ... 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears, M.Sc., ... Mount Pleasant.
Professor of Pomology.

William P. B. Lockwood, M.Sc., ... 34 North Prospect Street.
Professor of Dairying.

[1] On account of ill health not in administrative charge; Associate Professor Osmun acting as head of department.

ALEXANDER E. CANCE, Ph.D., ... 9 Fearing Street.
Professor of Agricultural Economics and Supervisor of Agricultural Surveys.
JOSEPH S. CHAMBERLAIN, Ph.D., ... Mount Pleasant.
Professor of Organic and Agricultural Chemistry.
JOHN C. GRAHAM, B.Sc.Agr., ... Lincoln Avenue.
Professor of Poultry Husbandry.
G. CHESTER CRAMPTON, Ph.D., ... 86 Pleasant Street.
Professor of Insect Morphology.
WILLIAM D. CLARK, A.B., M.F., ... 3 Mount Pleasant.
Professor of Forestry.
CHRISTIAN I. GUNNESS, B.Sc., ... 105 Butterfield Avenue.
Professor of Rural Engineering.
HENRY W. FLEET, Lieutenant, U. S. A., ... 5 Phillips Street.
Professor of Military Science and Tactics.
HAROLD F. TOMPSON, B.Sc., ... 10 Temple Street, Arlington.
Professor of Market Gardening.
JOHN PHELAN, A.M., ... 5 Allen Street.
Professor of Rural Sociology.
JOHN C. McNUTT,[1] B.Sc.Agr., ... 5 School Street.
Professor of Animal Husbandry.
A. VINCENT OSMUN, M.Sc., ... Kendrick Place.
Associate Professor of Botany.
CLARENCE E. GORDON, Ph.D., ... 38 Lincoln Avenue.
Associate Professor of Zoölogy and Geology.
ROBERT W. NEAL, A.M., ... Box 708, Amherst.
Associate Professor of English.
EDGAR L. ASHLEY, A.M., ... 24 Pleasant Street.
Associate Professor of German.
ALEXANDER A. MACKIMMIE, A.M., ... North Amherst.
Associate Professor of French.
BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Associate Professor of Beekeeping.
JOHN A. McLEAN,[2] A.B., B.Sc.Agr., ... – –
Associate Professor of Animal Husbandry.
CHARLES A. PETERS, Ph.D., ... 2 South Sunset Avenue.
Associate Professor of Inorganic and Soil Chemistry.
GEORGE E. GAGE, Ph.D., ... 27 Sunset Avenue.
Associate Professor of Animal Pathology.
CURRY S. HICKS, B.Pd., ... 8 Allen Street.
Associate Professor of Physical Education and Hygiene.
ERNEST ANDERSON, Ph.D., ... 3 Phillips Street.
Associate Professor of General and Physical Chemistry.
WALTER W. CHENOWETH, A.B., M.Sc., ... North Amherst.
Associate Professor of Pomology.
F. H. HESSELINK VAN SUCHTELEN, Ph.D., ... 30 North Prospect Street.
Associate Professor of Microbiology.
ARNO H. NEHRLING, ... 24 Pleasant Street.
Associate Professor of Floriculture.
RALPH J. WATTS, B.Sc., ... 10 Nutting Avenue.
Secretary of the College.
CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.
C. ROBERT DUNCAN, B.Sc., C.E., ... 23 Lincoln Avenue.
Assistant Professor of Mathematics.
ARTHUR K. HARRISON, ... 8 Allen Street.
Assistant Professor of Landscape Gardening.
ELVIN L. QUAIFE, B.Sc.Agr., ... 103 Butterfield Avenue.
Assistant Professor of Animal Husbandry.
WILLIAM L. MACHMER, A.M., M.E., ... 3 Kendrick Place.
Assistant Professor of Mathematics.
HENRY E. SMITH, A.M., ... 24 Pleasant Street.
Assistant Professor of English.

[1] Services began Jan. 1, 1916.

[2] Resigned Sept. 30, 1915.

WALTER E. PRINCE, Ph.B., A.M., ... Kendrick Place.
Assistant Professor of English.
HAROLD E. ROBBINS, B.Sc., A.M., ... 12 Nutting Avenue.
Assistant Professor of Physics.
PAUL J. ANDERSON, Ph.D., ... 24 Pleasant Street.
Assistant Professor of Botany.
EARL JONES, M.Sc., ... 24 Pleasant Street.
Assistant Professor of Agronomy.
CHARLES H. THOMPSON, M.Sc., ... 77 South Pleasant Street.
Assistant Professor of Horticulture.
ANDREW S. THOMSON, Ph.B., ... 10½ Kellogg Avenue.
Assistant Professor of Market Gardening.
ORVILLE A. JAMISON, B.Sc., ... 7 East Pleasant Street.
Assistant Professor of Dairying.
FRANK W. RANE, M.F., ... Boston.
Lecturer in Forestry.
HELENA T. GOESSMANN, M.Ph., ... 13 Main Street.
Instructor in English.
WILLIAM L. HARMOUNT, A.B., ... 86 Pleasant Street.
Instructor in French.
ARTHUR N. JULIAN, A.B., ... Farview Way.
Instructor in German.
FREDERICK A. MCLAUGHLIN, B.Sc., ... 24 Pleasant Street.
Instructor in Botany.
SAMUEL COONS, ... 2 McClellan Street.
Instructor in Dairying.
FRANK N. BLANCHARD, A.B., ... 23 Lincoln Avenue.
Instructor in Zoölogy and Geology.
LOYAL F. PAYNE, B.Sc., ... 12 Chestnut Street.
Instructor in Poultry Husbandry.
WILLIAM S. REGAN, Ph.D., ... 6 Allen Street.
Instructor in Entomology.
FRANK P. RAND, A.B., ... 24 Pleasant Street.
Instructor in English.
HAROLD E. BALDINGER, B.Sc., ... 4 North Prospect Street.
Instructor in Dairying.
WALTER M. PEACOCK,[1] B.Sc., ... 24 Pleasant Street.
Instructor in Farm Management.
GLENN J. WIGHT,[2] B.Sc., ... Lincoln Building, Main Street.
Instructor in Animal Husbandry.
RAYMOND G. SMITH, B.Sc., ... Savings Bank Block.
Assistant in Botany.
WILLIAM J. FITZMAURICE, ... – –
Assistant in Physical Education.
HAROLD M. GORE, B.Sc., ... 8 Allen Street.
Assistant in Physical Education.
BURT A. HAZELTINE, B.Sc., ... 4 North Prospect Street.
Assistant in Mathematics.
ARAO ITANO, B.Sc., ... Lincoln Building, Main Street.
Assistant in Microbiology.
PAUL SEREX, Jr., B.Sc., ... M. A. C.
Assistant in Chemistry.
FREDERICK G. MERKLE, B.Sc., ... East Street.
Assistant in Agronomy.
HARRY C. THOMPSON, B.Sc., ... 16 North Prospect Street.
Assistant in Physics.
FREDERICK W. READ, B.Sc., ... 84 Pleasant Street.
Assistant in Agricultural Economics.

[1] Services began Jan. 1, 1916.

[2] Temporary appointment.

GRADUATE ASSISTANTS.

ROBERT P. ARMSTRONG, B.Sc., ... Phi Sigma Kappa House.
Department of Pomology, Experiment Station.
ROY C. AVERY, B.Sc., ... 17 Phillips Street.
Department of Microbiology.
CHARLES G. BAIRD, A.M., ... 23 Lincoln Avenue.
Department of Rural Sociology.
J. STANLEY COBB, B.Sc., ... 5 Allen Street.
Department of Agronomy.
WILLIAM L. DORAN, B.Sc., ... Clark Hall.
Department of Botany.
ALEXANDER J. ERICHSON, B.Sc., ... 4 North Prospect Street.
Department of Chemistry.
ERNEST E. FISH, B.Sc., ... 5 Allen Street.
Department of Animal Husbandry.
EGERTON G. HOOD, B.Sc., ... 15 Spring Street.
Industrial Tests, Experiment Station.
RUSSELL F. LUND, A.B., ... Pine Heights.
Department of Rural Sociology.
RALPH L. MACNEIL, B.Sc., ... M. A. C.
Department of Chemistry.
WILLIAM T. PAYNE, B.Sc., ... 12 Chestnut Street.
Industrial Tests, Experiment Station.
GERALD E. PERRY, B.Sc., ... 19 Amity Street.
Department of Chemistry.
ARTHUR W. PHILLIPS, B.Sc., ... 4 North Prospect Street.
Department of Chemistry.
IRVING C. ROOT, B.Sc., ... Mount Pleasant.
Department of Landscape Gardening.
CARL J. STRAND, A.M., ... 75 Pleasant Street.
Department of Agricultural Economics.
ARTHUR S. THURSTON, B.Sc., ... 9 Fearing Street.
Department of Floriculture.
DONALD WHITE, B.Sc., ... 16 North Prospect Street.
Department of Poultry Husbandry, Experiment Station.
STUART C. VINAL, B.Sc., ... 112 Pleasant Street.
Department of Entomology, Experiment Station.

THE EXPERIMENT STATION STAFF.

ADMINISTRATION.

WILLIAM P. BROOKS, Ph.D., ... 6 Farview Way.
Director.
JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Vice-Director.
FRED C. KENNEY, ... Mount Pleasant.
Treasurer.
CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.

DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., ... 6 Farview Way.
Agriculturist.
HENRY J. FRANKLIN, Ph.D., ... Wareham.
In charge of Cranberry Investigation.
EDWIN F. GASKILL, B.Sc., ... North Pleasant Street.
Assistant Agriculturist.
ROBERT L. COFFIN, ... Farview Way.
Assistant.

DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

GEORGE E. STONE,[1] Ph.D., ... Mount Pleasant.
Botanist and Plant Pathologist.
GEORGE H. CHAPMAN, M.Sc., ... 13 Fearing Street.
Assistant Botanist.
ORTON L. CLARK, B.Sc., ... Mount Pleasant.
Assistant Botanist.

DEPARTMENT OF ENTOMOLOGY.

HENRY T. FERNALD, Ph.D., ... 44 Amity Street.
Entomologist.
BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Apiarist.
ARTHUR I. BOURNE, A.B., ... 12 East Pleasant Street.
Assistant Entomologist.

DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Chemist.
EDWARD B. HOLLAND, Ph.D., ... 28 North Prospect Street.
Associate Chemist, in charge of Research Division.
FRED W. MORSE, M.Sc., ... 40 Pleasant Street.
Research Chemist.
HENRI D. HASKINS, B.Sc., ... 14 Amity Street.
In charge of Fertilizer Division.
PHILIP H. SMITH, M.Sc., ... 102 Main Street.
In charge of Feed and Dairy Division.
LEWELL S. WALKER, B.Sc., ... 19 Phillips Street.
Assistant.
RUDOLPH W. RUPRECHT,[2] M.Sc., ... – –
Assistant.
CARLTON P. JONES, M.Sc., ... 30 North Prospect Street.
Assistant.
CARLOS L. BEALS, B.Sc., ... Kendrick Place.
Assistant.
WALTER S. FROST,[3] B.Sc., ... – –
Assistant.
CHARLES W. DAVIS,[4] B.Sc., ... Kappa Sigma House.
Assistant.
JAMES P. BUCKLEY, Jr., B.Sc., ... 29 Lincoln Avenue.
Assistant.
JAMES T. HOWARD, ... 154 Main Street.
Collector.
HARRY L. ALLEN, ... 89 Main Street.
Assistant.
JAMES R. ALCOCK, ... North Amherst.
Assistant.

DEPARTMENT OF HORTICULTURE.

FRANK A. WAUGH, M.Sc., ... Campus.
Horticulturist.
FRED C. SEARS, M.Sc., ... Mount Pleasant.
Pomologist.
JACOB K. SHAW, Ph.D., ... 1 Allen Street.
Research Pomologist.

[1] On account of ill health not in administrative charge; Associate Professor Osmun acting as head of Department of Botany.
[2] Absent on leave; position filled temporarily by Mr. Norman H. Borden.
[3] Resignation took effect Oct. 31, 1915.
[4] Services began Dec. 1, 1915.

Department of Meteorology.

John E. Ostrander, A.M., C.E., ... 33 North Prospect Street.
Meteorologist.

Department of Microbiology.

Charles E. Marshall, Ph.D., ... 44 Sunset Avenue.
In charge of Department.
F. H. Hesselink van Suchtelen, Ph.D., ... 30 North Prospect Street.
Associate Professor of Microbiology.

Department of Poultry Husbandry.

John C. Graham, B.Sc.Agr., ... Lincoln Avenue.
In charge of Department.
Hubert D. Goodale, Ph.D., ... North Amherst.
Research Biologist.

Department of Veterinary Science.

James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Veterinarian.
George E. Gage, Ph.D., ... 27 Sunset Avenue.
Associate Professor of Animal Pathology.
Beryl H. Paige, A.B., ... 42 Lincoln Avenue.
Assistant in Veterinary Science.
Arnold P. Sturtevant, A.B., ... 41 Lincoln Avenue.
Assistant in Veterinary Science.

THE EXTENSION SERVICE STAFF.

William D. Hurd, M.Agr., ... 46 Amity Street.
Director of the Extension Service and Supervisor of Short Courses.
Earnest D. Waid, B.Sc.Agr., ... 61 Amity Street.
Assistant Director.
Sumner R. Parker,[1] B.Sc., ... 41 Amity Street.
Assistant State Leader and Extension Professor of Rural Organization.
Orion A. Morton, ... Lincoln Avenue.
Extension Professor of Agricultural Education.
Ezra L. Morgan, A.M., ... 2 Allen Street.
Extension Professor of Community Planning.
Laura Comstock, ... 84 Pleasant Street.
Extension Professor of Home Economics.
Richard H. Ferguson,[2] B.Sc.Agr., ... – –
Extension Professor of Agricultural Economics.
E. Farnam Damon,[3] B.Sc., ... – –
Extension Associate Professor of Agricultural Economics.
Ralph W. Rees, A.B., B.Sc., ... 24 Pleasant Street.
Extension Instructor in Pomology.
Frank A. C. Smith,[3] B.Sc., ... – –
Extension Instructor in Civic Improvement.
Erwin H. Forbush, ... 8 Nutting Avenue.
Supervisor of Correspondence Courses.
Ethel H. Nash, ... 16 Nutting Avenue.
Extension Instructor in Agricultural Education.
Benjamin W. Ellis,[4] B.Sc., ... – –
Assistant State Leader.
Harriet J. Hopkins,[5] B.Sc., ... – –
Extension Instructor in Home Economics.

[1] Services began Dec. 6, 1915.
[2] Died Dec. 1, 1915.
[3] Services began Feb. –, 1916.
[4] Resignation took effect Dec. 31, 1915.
[5] Resignation took effect Oct. 6, 1915.

ALFRED G. LUNN, B.Sc., ... North Amherst.
Extension Instructor in Poultry Husbandry.
ERIC N. BOLAND, M.Sc., ... 13 Fearing Street.
Extension Instructor in charge of Boys' and Girls' Pig Club Work.
MARIE SAYLES,[1] B.Sc., ... 79 Pleasant Street.
Extension Instructor in Home Economics.
WESLEY H. BRONSON, B.Sc., ... Lincoln Block.
Extension Instructor in Farm Demonstrations.
WILLIAM F. TURNER,[2] B.Sc., ... – –
Extension Instructor in Animal Husbandry.

THE CLERICAL STAFF.

ELBERT L. ARNOLD,[3] Northampton.
Chief Clerk, Extension Service.
CLARISSA G. BABCOCK,[4] – –
Library Assistant.
ELEANOR BARKER,[5] 9 Phillips Street.
Clerk, Department of Floriculture.
ELEANOR F. BISHOP, ... 3 Spaulding Street.
Clerk, Treasurer's Office.
FRANCES C. BOYNTON, A.B., ... 10 Hallock Street.
Clerk, Department of Farm Administration.
JOHN K. BROADFOOT, ... 7½ East Pleasant Street.
Cashier, Treasurer's Office.
BERTHA A. BROCKHAUS,[6] – –
Clerk, President's Office.
ANNE BUTLER,[7] – –
Assistant in Library.
MABEL R. CASE,[8] A.B., ... – –
First Clerk, Extension Service.
ADA M. CHANDLER, A.B., ... 3 Fearing Street.
Cataloguer, Library.
LENA V. CHAPMAN, ... 77 South Pleasant Street.
Library Assistant.
LUCIA G. CHURCH, ... North Amherst.
First Clerk, Experiment Station.
PHYLLIS J. COGSWELL, ... 79 Pleasant Street.
Stenographer, Department of Agricultural Education.
JESSIE V. CROCKER, ... Sunderland.
Clerk, Department of Botany.
MARCELLA P. CURRY, B.Sc., ... Draper Hall.
Clerk, Department of Poultry Husbandry.
LOUISE G. DAVIDSON,[9] 7 Northampton Road.
Telephone Operator, Stockbridge Hall.
F. ETHEL FELTON,[10] 8 Allen Street.
Clerk, Director's Office, Experiment Station.
LINA E. FISHER, ... 28 Pleasant Street.
Clerk, Department of Chemistry.
GRACE E. GALLOND, ... 28 Pleasant Street.
Clerk, Department of Dairying.
LILLIAN M. GELINAS, ... 77 Pleasant Street.
Clerk, President's Office.
ALICE M. GILBERT, ... 9 Phillips Street.
First Clerk, Division of Agriculture.
HANNAH M. GRIFFIN, A.B., ... 9 Phillips Street.
Clerk, Department of Farm Administration.

[1] Services began Sept. 16, 1915.
[2] Services began Dec. 8, 1915.
[3] Services began Jan. 14, 1916.
[4] Resignation took effect Sept. 30, 1915.
[5] Services began Dec. 13, 1915.
[6] Resignation took effect Dec. 31, 1915.
[7] Services began Oct. 18, 1915; resignation took effect Nov. 13, 1915.
[8] Resignation took effect Jan. 31, 1916.
[9] Services began Nov. 15, 1915.
[10] Services began Nov. 1, 1915.

Cora B. Grover, Clerk, Director's Office, Extension Service.	North Amherst.
Marion Guertin, Stenographer, Department of Beekeeping.	20 Pleasant Street.
Lillian S. Hadfield, Clerk, Extension Service.	9 Phillips Street.
Laura W. Hager,[1] A.B., Clerk, Department of Agricultural Economics.	Deerfield.
Mary E. Horton, Clerk, Department of Rural Social Science.	15 Fearing Street.
Esther L. Houghton, A.B., Clerk, Department of Microbiology.	Draper Hall.
Alice M. Howard, First Clerk, Experiment Station.	North Amherst.
Lorian P. Jefferson, A.M., Research Secretary, Division of Rural Social Science.	84 Pleasant Street.
Helena Keiber, Stenographer, Extension Service.	56 Pleasant Street.
Irene A. Martin,[2] Stenographer, Treasurer's Office.	East Street.
Rebecca L. Mellor, Clerk, Experiment Station.	10 Kellogg Avenue.
Nell C. Milton, Stenographer, Division of Rural Social Science.	Draper Hall.
Elizabeth E. Mooney, Stenographer, Department of Poultry Husbandry.	Draper Hall.
Bridie E. O'Donnell, Clerk, Department of Entomology.	Hadley.
Helen C. Pomeroy, Stenographer, Division of Horticulture.	Draper Hall.
Vivian Roy,[3] Library Assistant.	5 McClellan Street.
Gladys E. Russell, A.B., Clerk, Division of Horticulture.	9 Phillips Street.
Edna M. Sanders, Bookkeeper, Treasurer's Office.	Hadley.
Mary I. Shores, Clerk, Dean's Office.	10 Woodside Avenue.
Elsa Slattery, Stenographer, Extension Service.	Northampton.
Dorothy F. Smith,[4] Clerk, Department of Floriculture.	– –
Harriet C. Stevenson,[5] Stenographer, Department of Agricultural Economics.	– –
Ethel M. Turner,[6] Library Assistant.	55 Pleasant Street.
Olive M. Turner, B.Sc., Clerk, Registrar's Office.	22 Spaulding Street.
Dorothy M. Tyacke,[7] Stenographer, Treasurer's Office.	– –
Henrietta L. Webster, First Clerk, Treasurer's Office.	Draper Hall.
Aurelia B. Wentworth, Stenographer, Division of Agriculture.	South Amherst.

[1] Services began Dec. 1, 1915.
[2] Services began Oct. 26, 1915.
[3] Services began Nov. 29, 1915.
[4] Resignation took effect Dec. 10, 1915.
[5] Resignation took effect Sept. 9, 1915.
[6] Services began Nov. 26, 1915.
[7] Resignation took effect Oct. 26, 1915.

STAFF OF OPERATING AND MAINTENANCE.

John J. Barber, Farm Superintendent.	Campus.
Thomas Butterworth, Assistant Engineer.	6 Phillips Street.
John L. Byard, Superintendent of the Apiary.	21 Pleasant Street.
William Chesley, Steward of the Dining Hall.	Draper Hall.
Lawrence S. Dickinson, B.Sc., Superintendent of Grounds.	2 Farview Way.
Clarence A. Jewett, Superintendent of Buildings.	112 Pleasant Street.
John J. Lee, Assistant to the Military Detail.	38 Cottage Street.
Florence Levensaler, Resident Nurse.	Infirmary.
Alexander Smart,[1] Assistant to the Commandant.	East Pleasant Street.
Newton Wallace, Electrician.	Campus.
James Whiting, Foreman, Department of Floriculture.	16 Hallock Street.

[1] Services began Nov. 2, 1915.

Standing Committees of the Faculty.

1915-16.

Catalogue and Other Publications.

Associate Professor Neal.
Assistant Professor Smith.
Secretary Watts.

Commencement.

Professor Paige.
Treasurer Kenney.
Lieutenant Fleet.
Associate Professor Peters.
Associate Professor Nehrling.
Assistant Professor Duncan.
Secretary Watts.

Course of Study.

President Butterfield.
Dean Lewis.
Professor Hart.
Professor Waugh.
Professor Foord.
Professor Sprague.
Professor Fernald.
Professor Ostrander.
Professor Marshall.
Professor Chamberlain.
Professor Cance.
Associate Professor Chenoweth.

Discipline (Advisory).

Dean Lewis.
Professor Hasbrouck.
Associate Professor Hicks.
Associate Professor Mackimmie.
Assistant Professor Machmer.

Employment.

Professor Sears.
Dean Lewis.
Treasurer Kenney.
Professor Haskell.

ENTRANCE EXAMINATIONS AND ADMISSION.

Registrar HASBROUCK.
Dean LEWIS.
Associate Professor OSMUN.
Associate Professor E. ANDERSON.
Associate Professor ASHLEY.
Assistant Professor MACHMER.

HEALTH AND SANITATION.

Professor MARSHALL.
Treasurer KENNEY.
Lieutenant FLEET.
Professor LOCKWOOD.
Miss COMSTOCK.
Associate Professor HICKS.

LIBRARY.

Professor MARSHALL.
Professor SPRAGUE.
Professor GUNNESS.
Assistant Professor A. S. THOMSON.
Mr. GREEN.

SCHEDULE.

Professor LOCKWOOD.
Associate Professor PETERS.
Assistant Professor DUNCAN.

SCHOLARSHIP.

Dean LEWIS.
Registrar HASBROUCK.
Associate Professor GORDON.
Associate Professor MACKIMMIE.
Assistant Professor HARRISON.
Assistant Professor MACHMER.

STUDENT LIFE.

President BUTTERFIELD.
Dean LEWIS.
Treasurer KENNEY.
Director HURD.
Professor CHAMBERLAIN.
Professor SPRAGUE.
Professor HART.
Professor HASKELL.
Professor CRAMPTON.
Professor PHELAN.
Professor LOCKWOOD.
Associate Professor E. ANDERSON.
Associate Professor MACKIMMIE.
Associate Professor HICKS.
Secretary WATTS.
Assistant Professor QUAIFE.
Assistant Professor MACHMER.
Assistant Professor A. S. THOMSON.
Assistant Professor ROBBINS.

Unclassified Students.

Dean Lewis.
Registrar Hasbrouck.
Professor Sears.
Professor Haskell.

Appointed to Athletic Board.

Dean Lewis.
Registrar Hasbrouck.
Associate Professor Osmun.

Appointed to Nonathletic Board.

Professor Lockwood.
Assistant Professor Machmer.

THE COLLEGE.

Admission.

A. Application for Admission.

All correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. Modes of Admission.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

Certificates. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present at least three of the necessary fourteen credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

Examinations. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

In June, ...	Amherst, Department of Physics building.
	Boston, College of Liberal Arts, Boston University.
	Worcester, Horticultural Hall.
In September, ...	Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 22–24, inclusive, 1916. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M.	Registration.[1]
8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Solid geometry.
4.00 P.M.	Physics.

Second Day.

8.00 A.M.	Required English.
11.00 A.M.	Algebra.
2.00 P.M.	History, required and elective.

Third Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1916, the examinations will be given September 13 to 16, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M.	Registration.
1.15–5.00 P.M.	Greek A and B.

Second Day.

8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Solid geometry.
4.00 P.M.	Physics.
5.00 P.M.	Elective English.

Third Day.

8.00 A.M.	Required English.
11.00 A.M.	Algebra, agriculture.
2.00 P.M.	History, required and elective.

Fourth Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

[1] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

C. Requirements for Admission.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year. **Neither more nor less credit will be given in any subject than is indicated in the table below.** Fourteen units must be offered for admission. In the list given below, *every subject in black-faced type is absolutely required and no substitution is allowed.* The subjects so typed total eight and one-half units. In addition to these points five and one-half more units must be chosen from the subjects printed in light-faced type. Not more than four half-credit units may be offered. No applicant deficient in both algebra and plane geometry will be admitted.

Agriculture,[1]	½ or 1
Botany,[2]	½ or 1
Chemistry,[2]	1
Algebra,	1½
Plane geometry,	1
Solid geometry,	½
Trigonometry,	½
Physics,[2]	1
Geology,	½
Physiography,	½
Physiology,	½
Zoölogy,[2]	½
History[3] (Ancient; Medieval and Modern; English; General; United States and Civics), *any one,*	1[4]
English 1,	1½
English 2,	1½
Modern Language (elementary French or elementary German),	2
Elementary French,[5]	2
Elementary German,[5]	2
Intermediate French,	1
Advanced French,	1
Intermediate German,	1
Advanced German,	1
Greek A,[1]	2
Greek B,[1]	1
Latin A,	2
Latin B,	1
Commercial geography,[6]	½
Drawing,[6]	½
Manual training,[6]	½ or 1

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, below).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books; but their certificates must state that note-books have been satisfactorily completed.

[1] Examination in September only.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] One must be offered for the required point; one, two or three others may be offered for elective points.

[4] For each offered.

[5] May be offered as elective if not offered to satisfy *required* points.

[6] On certificate only, no examination given.

D. Statement of Preparation Required for Admission.

Agriculture. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade. **The examination in agriculture will be given in September only.**

Botany. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Steven's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

Mathematics. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the nth term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the

sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

Physics. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Text-book of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

Physiology. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

Zoölogy, Physiography, Geology. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

History. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval his-

tory; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

ENGLISH. — For 1916–19 inclusive: —

The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature.* — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. Reading (One and One-half Units). — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I.: —

Group I. Classics in Translation: The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of Books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of Books XI., XIII., XIV., XV., XVIII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any selection from Group I. a selection from any other group may be substituted.

Group II. Shakspere: "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo

and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"[1] "Macbeth;"[1] "Hamlet."[1]

Group III. Prose Fiction: Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voyages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one;* Jane Austen's novels, any *one;* Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens' novels, any *one;* Thackeray's novels, any *one;* George Eliot's novels, any *one;* Mrs Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reade's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevenson's "Treasure Island" or "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one;* Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables" or "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

Group IV. Essays, Biography, etc.: Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tatler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" selections from Irving's "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" selections from Lamb's "Essays of Elia" (about 100 pages); selections from Lockhart's "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison and Steele in the English Humorists;" Macaulay: any one of the following essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay;" selections from Trevelyan's "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years before the Mast;" Lincoln's "Selections," including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address, the letter to Horace Greeley, together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson and later writers; a collection of "Letters" by various standard writers.

Group V. Poetry: Palgrave's "Golden Treasury" (first series), Books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury" (first series), Book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens" and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake" or "Marmion;" Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The

[1] If not chosen for study under B.

Armada," "Ivry;" Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum" and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

B. Study. — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. Drama: Shakspere's "Julius Cæsar," "Macbeth," "Hamlet."

Group II. Poetry: Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

Group III. Oratory: Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

Group IV. Essays: Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading. For this purpose the examiner will provide several subjects, perhaps eight or ten, from which the candidate may make his own selections. He will not be expected to write more than four hundred words per hour.

The examination in literature will include: —

(*a*) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above. The candidate will be required to submit a list of the books read in preparation for the examination, certified by the principal of the school in which he was prepared; but this list will not be made the basis of detailed questions.

(*b*) A test on the books prescribed for study, which will consist of questions

upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

English, Elective. — To secure a fourth entrance credit in English the applicant must have done, in addition to the requirements stated above, work equivalent to a course meeting at least four times a week for one year. Applicants not certified with this fourth entrance credit will be examined in September, provided that they notify the Department of English of their desire on or before June 1. **(The examination in English elective will be given in September only. After September, 1916, the maximum credits accepted in English, either by certificate or by examination, will be three.)**

Subjects accepted. — Applicants may offer (*a*) any one of the subjects stated hereunder, or (*b*) any two of these subjects in combination.

(*a*) History of American literature.
(*b*) History of English literature.
(*c*) Classics *other than those read to meet the three-credit requirement.*
(*d*) Advanced composition.
(*e*) History of the English language.
(*f*) Advanced high school grammar.

French. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

German. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon

certificate, or has written the examination for both elementary and intermediate German.

GREEK. — Greek will receive credit as an elective requirement upon either examination or certification, as follows. **(The examination in Greek A and Greek B will be given in September only.)**

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either Books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," Books I. to IV.

COMMERCIAL GEOGRAPHY.[1] — Preparation should be made in a course equivalent to that laid down in Adams' "Commercial Geography," Trotter's "Geography of Commerce," or a similar work. (No examination given.)

DRAWING.[1] — The applicant may offer either freehand or mechanical drawing or both. He must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable him to draw correctly a simple geometric model from memory; or, if he present mechanical drawing, he must have working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented, see "Manual Training." (No examination given.)

MANUAL TRAINING.[1] — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

[1] On certificate only; no examination given.

E. Admission to Advanced Standing.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. Other Information about Entrance.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. Not more than five and one-half credits from the elective group will be accepted. No candidate deficient in both algebra and plane geometry will be admitted.
4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination, in the week following the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.
5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.
6. Examinations in part of the subjects required for entrance may be taken one year before entering college.
7. For information concerning expenses, scholarships, etc., see "General Information."
8. For information concerning admission to short courses see "Short Courses."

G. Unclassified Students.

All requests for information concerning admission of unclassified students should be addressed to Dean Edward M. Lewis, chairman of committee on unclassified students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-year high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

9. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

10. No unclassified student shall be allowed to participate in any intercollegiate contests.

Courses of Instruction.

A. TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

The figures indicate the number of credit hours a week. For details, see the descriptions of courses.

Freshman Year.

First Semester.

All work required.

Subjects.	Hours per Week.
Chemistry,	3
Algebra,	3
Solid geometry,[1]	2
English,	4
Public speaking (at option of instructor),	1
French or German,[2]	4
Drill,	1
Hygiene,	1
College lite (attendance without credit).	
	18 or 19

Second Semester.

All work required.

Subjects.	Hours per Week.
Animal husbandry,	2
Chemistry,	3
Trigonometry,	3
Algebra,	2
English,	4
Public speaking (if not taken in semester one),	1
French or German,	4
Drill,	1
Physical education,	1
	20 or 21

[1] To be taken in course when not offered for entrance.

[2] Students who have had three or four years of one language in the preparatory school will elect the other language. Students who have had two years of one language may have their choice of election. Whichever language they so elect must be continued to the end of the first semester of the sophomore year. Eleven college credits are required in this language.

SOPHOMORE YEAR.

First Semester.

All work required except chemistry or animal husbandry.

Subjects.	Hours per Week.
Agronomy,	3
Physics,	5
Zoölogy,	3
English,	2
French or German,	3
Tactics,	1
Drill,	1
	18
[Chemistry or animal husbandry (may be elected subject to approval by the dean),	3]
	[21]

Second Semester.[1]

Required.

Subjects.	Hours per Week.
Elementary horticulture,	2
Botany,	4
English,	2
Agricultural industry,	3
Drill,	1
Tactics,	1
Physical education,	1
	14

Elective.

French or German, Geology, Physics, Chemistry, Surveying,	Each 3 hours.	Any two,	6
			20

The following table shows the course of study which it is intended will be in effect with the entrance of the class of 1920: —

FRESHMAN YEAR.

First Semester.		*Second Semester.*	
English and public speaking,	4 or 3	English and public speaking,	4 or 3
Algebra,	3	Trigonometry,	3
Geometry,	2	Algebra,	2
Chemistry,	3	Chemistry,	3
Drill, etc., 2; military tactics, 1,	3	Drill, etc., 2; military tactics, 1,	3
Language,	3	Agricultural geology,	3
Agriculture and horticulture,	2	Language,	3
	20 or 19	Agriculture and horticulture,	2
			23 or 22

[1] All courses under "Required," with any two of those under "Elective."

SOPHOMORE YEAR.

First Semester.

Physics,	4
English,	2
Zoölogy,	3
Rural community,	2
Drill, etc.,	2
2 or 3 electives,	6 or 9
	19 to 22

Second Semester.

Agronomy,	3
English,	2
Botany,	4
Drill, etc.,	2
Agricultural industry,	3
2 or 3 electives,	6 or 9
	20 to 23

Electives (subject to Revision).

Language,	3
Mathematics,	3
Agriculture,	3
Chemistry,	3
Free-hand drawing,	3
Anthropology,	3

Electives (subject to Revision).

Language,	3
Agriculture (?),	3
Chemistry,	3
Entomology,	4
Geology,	3
Surveying,	3
Horticulture,	3
Physics,	4
Zoölogy,	3
Agricultural education (?),	3
Mechanical drawing,	3

FOUR TERM PLAN.

The faculty and the trustees have approved a plan whereby, beginning September, 1916, the college year will be divided into four terms, including a summer session. It is expected that by offering work in the practical departments during the summer months a more adequate training will be assured to the students. The plan contemplates no marked changes in the content or character of the various courses of study described in this catalogue. The adaptation of these courses to the new division of the year is now being made, and a detailed statement relative to the readjustment will be published in April or May, 1916. A copy of this bulletin may be had on application.

B. MAJORS: JUNIOR AND SENIOR YEARS.

General Statement.

A major consists of 30 hours of correlated work, to be arranged by the student and an instructor called the adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

Rules governing Majors.

Rule 1. *Election.* — Each student, in the second semester of his sophomore year, shall elect a major subject from the list of majors given below; and this major shall consist of 30 credit hours of correlated work.

Rule 2. *Minimum Credits.* —The minimum number of credits for the junior and senior years shall be 65, inclusive of military drill and physical education.

Rule 3. *Maximum Credits.* — The maximum number of credits for any semester of the junior or senior year shall be 21.

Rule 4. *Humanities and Rural Social Science.* — A minimum of 12 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 3 credit hours will be required in each of the divisions.

Rule 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 30 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

Rule 6. *Free Electives.* — Each student is required to take 30 hours in his major and also 12 hours in the Divisions of the Humanities and Rural Social Science, making a total of 42 hours. He is allowed free choice of courses to complete his required hours, this remainder amounting to 17 hours minimum, or 37 hours maximum for the two years.

Rule 7. *Registration.* — No upper classman shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office on June 1.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the year and countersign the card.

(3) Each course card must be filled out, giving the name of student, his college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours of free elections added by the student, the card must be returned to the registrar not later than June 10.

Rule 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by the committee on scholarship, they become operative at the beginning of the semester following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

LIST OF MAJORS IN THE DIVISION OF AGRICULTURE.

Agriculture.

Professor James A. Foord, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 6,	3
Animal Husbandry 3,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Dairying 1,	3
Dairying 2,	3
Farm Administration 3,	3
Farm Administration 4,	3
Microbiology 1 and 2,	5
	32

Chemistry 7 and 8, Veterinary Science 1, Microbiology 2, Pomology 1 and Animal Husbandry 6 are suggested as additional courses for the student fitting himself for general agriculture.

Agronomy.

Professor Sidney B. Haskell, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 4,	3
Agronomy 5,	3
Agronomy 6,	3
Agronomy 8,	3
Animal Husbandry 9,	3
Farm Administration 4,	3
Chemistry 5,	5
Chemistry 6,	5
	31

Animal Husbandry.

Professor John C. McNutt, Adviser.

Course.	Credit.
Agronomy 3,	3
Veterinary Science 1, veterinary hygiene and stable sanitation,	3
Veterinary Science 2, general veterinary pathology (materia medica and therapeutics),	3
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 10,	3
Animal Husbandry 11,	2
Dairying 1,	3
Farm Administration 3,	3
Farm Administration 4,	3
	32

Dairying.

Professor William P. B. Lockwood, Adviser.

Course.	Credit.
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 11,	2
Dairying 1,	3
Dairying 2,	3
Dairying 3,	3
Microbiology 11 and 12,	3
Farm Administration 3,	3
Farm Administration 4,	3
	29

Poultry Husbandry.

Professor John C. Graham, Adviser.

Course.	Credit.
Poultry Husbandry 1,	2
Poultry Husbandry 2,	2
Poultry Husbandry 3,	1
Poultry Husbandry 4,	1–3
Poultry Husbandry 5,	1
Poultry Husbandry 6,	3
Poultry Husbandry 7,	3
Poultry Husbandry 9,	3
Pomology 1,	3
Agronomy 3,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Veterinary Science 7,	3
	31–33

LIST OF MAJORS IN THE DIVISION OF HORTICULTURE.

Floriculture.

Associate Professor Arno H. Nehrling, Adviser.

Course.	Credit.
Floriculture 1,	4
Floriculture 2,	4
Floriculture 3,	3
Floriculture 4,	3
Horticulture 3,	3
Horticulture 4,	3
Entomology 1,	3
Market Gardening 2,	3
Botany 2,	4
	30

Note. — Horticulture 3 and 4 is a junior subject, but to balance the work for the two years it would be better for the floricultural students to take the course in the senior year.

Forestry.

Professor William D. Clark, Adviser.

Course.	Credit.
Forestry 3,	3
Forestry 4,	3
Forestry 5,	5
Forestry 6,	3
Entomology 5,	3
Landscape Gardening 1,	3
Horticulture 3,	3
Horticulture 4,	3
Botany 13,	4
	30

Students who propose to major in forestry should elect geology and surveying in sophomore year.

Landscape Gardening.

Professor Frank A. Waugh, Adviser.

Course.	Credit.
Landscape Gardening 1,	3
Landscape Gardening 2,	3
Landscape Gardening 3,	3
Landscape Gardening 4,	3
Landscape Gardening 5,	2
Landscape Gardening 6 or 10,	2
Landscape Gardening 7,	3
Landscape Gardening 8,	3
Drawing 1,	3
Drawing 2,	3
Horticulture 3,	3
	31

Courses for juniors *only:* Landscape Gardening 1 and 2, Drawing 1 and 2.
Courses for seniors and graduates *only:* Landscape Gardening 3, 4, 7 and 8.
Courses open to juniors and seniors, both if possible: Horticulture 3 and 4.
This grouping of subjects is offered only as an example. Other groupings may be approved by the adviser, but such other groupings must be subject to the class schedule.

Pomology.

Professor Fred C. Sears, Adviser.

Course.	Credit.
Pomology 1,	3
Pomology 2,	3
Pomology 3,	3
Pomology 4,	3
Pomology 5,	3
Pomology 6,	2
Botany 5,	2
Agronomy 5,	3
Entomology 1,	3
Entomology 2,	3
	28

MAJOR IN THE DIVISION OF THE HUMANITIES.

Rural Journalism.

Associate Professor ROBERT W. NEAL, Adviser.

	Credit.
Rural Journalism 1,	3
Rural Journalism 2,	3
Rural Journalism 3,	2
Rural Journalism 4,	2
Rural Journalism 5,	1
Rural Journalism 7,	2
Rural Journalism 8,	2
Rural Journalism 9,	3
Rural Journalism 10,	3
Economics and Sociology 1,	3
Agricultural Economics 5,	3
Rural Sociology 1,	3
	30

LIST OF MAJORS IN THE DIVISION OF RURAL SOCIAL SCIENCE.

Agricultural Education.

Professor WILLIAM R. HART, Adviser.

Course.	Credit.
Agricultural Education 1,	3
Agricultural Education 2,	3
Agricultural Education 3,	3
Agricultural Education 4,	3
Agronomy 3,	3
Dairying 5,	2
Farm Administration 3,	3
Poultry Husbandry 1,	2
Market Gardening 2, / Agronomy 5,	3
Botany 5,	2
Pomology 1,	3
	30

Some substitutions of other technical courses for some of the technical courses above mentioned will be made to meet the needs of individual students.

Rural Social Science.

Professor JOHN PHELAN, Adviser.

Course.	Credit.
Economics and Sociology 1,	3
Economics and Sociology 8,	3
History and Government 3,	3
Agricultural Economics 3,	3
Agricultural Economics 5,	3
Agricultural Economics 7 or 8,	3
Rural Sociology 2,	3
Rural Sociology 5,	3
Rural Sociology 10,	3
Rural Sociology 8,	3
Agricultural Education 1 or 5,	3
	33

The major will consist of 30 hours selected from this list.

LIST OF MAJORS IN THE DIVISION OF SCIENCE.

Agricultural Chemistry.

Associate Professor CHARLES A. PETERS, Adviser.

Course.	Credit.
Chemistry 5,	5
Chemistry 6,	5
Chemistry 9,	5
Chemistry 10,	5
Chemistry 11,	5
Chemistry 12, 14 or 16,	5
Chemistry 13,	3
Chemistry 15,	3
Chemistry 18,	2
	38

The major will consist of 30 credit hours selected from this list. The student will be advised concerning other subjects suitable to be taken in connection with chemistry.

Economic Entomology.

Professor HENRY T. FERNALD, Adviser.

Course.	Credit.
Entomology 1,	3
Entomology 2,	2
Entomology 3,	4
Entomology 4,	4
Entomology 5,	3
Entomology 8,	3
Entomology 11,	2
Botany 5,	3
Zoölogy 3,	3
Zoölogy 4,	3
	32

A major in economic entomology does not necessarily include all the subjects given in this list, but may be varied to some extent, in accordance with the future plans of the student, other modifications being permissible.

Microbiology.

Professor CHAS. E. MARSHALL, Adviser.

Course.	Credit.
Microbiology 1 or 2,	5
Microbiology 3 or 4,	5
Microbiology 5 or 6,	3
Microbiology 7 or 8,	3
Chemistry 3,	5
Chemistry 4,	5
Chemistry 5,	3
Chemistry 6,	3
	32

Courses 9 in chemistry; 3, 4, 5 in botany; 3, 4, 5, 6 in zoölogy; 1, 3, 5, 6 in veterinary science, together with German and French, are suggested as collateral lines. Dairying 1 and Agronomy 5 are essential to a grasp of the larger problems involved in microbiology as applied to agriculture.

Plant Physiology and Pathology.

Professor GEORGE E. STONE,[1] Adviser.

Course.	Credit.
Botany 3,	4
Botany 4,	3
Botany 9,	4 or 5
Botany 10,	4 or 5
Botany 11,	4
Botany 12,	4
Chemistry 5,	5
Chemistry 6,	5
	33 or 35

SUMMARY.

There are four preliminary steps which a student should take in arranging for his major work.

1. Select a major.

2. Confer with major adviser for arrangement of courses, the plan to be approved by adviser in accordance with Rule 5 previously stated.

3. Select courses covering the four semesters of the junior and senior years in such a way that a minimum of 12 credits will be taken in the two divisions, the Humanities and Rural Social Science; the distribution of all but 3 of these credits may be decided by the student.

4. Choose other courses so that the total number of credits for any semester shall be not less than 16 nor more than 21. (See Rules 2 and 3.)

[1] On leave of absence; Associate Professor Osmun acting as head of Department of Botany.

C. UNDERGRADUATE COURSES.

All courses given in the *first semester bear odd numbers;* all given in the *second semester bear even numbers.* Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of the Book of Rules.

DIVISION OF AGRICULTURE.

Professor Foord.

AGRONOMY.

Professor Haskell, Assistant Professor Jones, Mr. Merkle, Mr. Cobb.

1. Soils and Fertilizers. — A study of soils and their properties, soil management, methods of soil improvement and maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 2 lecture periods and 1 laboratory period weekly. Credit, 3. Professor Haskell and Assistants.

3. Field and Forage Crops. — History, classification and production of maize and of those grasses, legumes, forage and root crops suited to New England conditions. The work includes lecture, laboratory and field study of these various crops. Prerequisites, Agronomy 1 and Botany 2. Primarily for juniors; 1 lecture and 2 laboratory periods. Credit, 3.
Assistant Professor Jones and Mr. Cobb.

4. Advanced Field Crops. — A study of the cereal grains, with lectures, laboratory and field study of the purity, quality and vitality of the seeds of farm crops and the handling, grading and judging of their products. Prerequisite, Agronomy 3. Primarily for juniors; 2 lectures and 1 laboratory period. Credit, 3. Assistant Professor Jones and Mr. Cobb.

5. Advanced Soils. — A field, lecture and laboratory course on soils and their adaptability to different uses. The field work consists of a detailed soil survey of the college farm and other areas, followed by a laboratory study of the physical properties of soils collected. Prerequisite, Agronomy 1. Primarily for seniors; 1 lecture period and 1 4-hour laboratory period weekly. Credit, 3.
Professor Haskell and Mr. Merkle.

6. Drainage and Irrigation. — A field and lecture course on soil improvement by drainage and irrigation, with special reference to problems of this nature as faced by Massachusetts farmers. Prerequisites, Agronomy 1 and Mathematics 6. One lecture period and 1 4-hour laboratory period weekly. Credit, 3. Professor Haskell and Mr. Merkle.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the func-

tions and importance of manures and fertilizers, and leading up to the views at present accepted. Considerable attention is devoted to consideration of the experimental work which has been done, and which is now in progress, on manures and fertilizers. For seniors only. Prerequisite, Agronomy 1. Three lectures weekly. Credit, 3. Professor HASKELL.

10. BREEDING OF FIELD CROPS. — This course deals with the improvement, by selection and breeding, of the crops studied in Courses 3 and 4. Prerequisite, Agronomy 4. Seniors only; 2 lecture periods weekly. Credit, 2.
Assistant Professor JONES.

ANIMAL HUSBANDRY.

Professor McNUTT,[1] Assistant Professor QUAIFE, Mr. WIGHT, Mr. FISH.

Required Course.

2. MARKET CLASSES AND GRADES OF LIVE STOCK. — A study of the different market classes and grades of horses, cattle, sheep and swine. The purpose of this course is to familiarize beginners with the different classes of stock, and to give them a grounding in live stock judging. Text-book, Craig's "Live Stock Judging." Freshmen; 2 laboratory periods. Credit, 2.
Professor McNUTT and Assistant Professor QUAIFE.

Elective Courses.

3. BREEDS AND TYPES OF LIVE STOCK. — A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Text-book, Plumb's "Breeds and Types of Farm Animals." Prerequisite, Animal Husbandry 2. Sophomores; 2 lectures and 2 laboratory periods. Credit, 4. Assistant Professor QUAIFE.

5. PRINCIPLES OF BREEDING. — This course is designed to familiarize the student with the problems involved in animal and plant improvement; to acquaint him with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; De Vrie's theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live stock improvement. Text, "Genetics," by Herbert E. Walter. Supplementary reading. Prerequisite, Zoölogy 1. Three lectures. Credit, 3. Mr. WIGHT.

6. LIVE STOCK MANAGEMENT. — The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, breaking to drive, driving, harnessing, casting and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work. Prerequisite, Animal Husbandry 3. Juniors; 1 laboratory period. Credit, 1.
Assistant Professor QUAIFE.

[1] Appointment in effect Jan. 1, 1916. Vice-Associate Professor J. A. McLean resigned Sept. 1, 1915.

8. Advanced Stock Judging. — This course is designed to equip animal husbandry students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits will be made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected largely from this class. Must be preceded by or accompany Animal Husbandry 6. Juniors; 2 laboratory periods. Credit, 2.

Professor McNutt.

9. Feeding and Management. — A study of the principles of animal nutrition; of the composition and qualities of feeding materials; of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production. Text-book, Henry's "Feeds and Feeding." Prerequisite, Chemistry 5 or 7. Seniors; 3 lectures. Credit, 3.

Assistant Professor Quaife.

10. Feeding and Management. — A continuation of Course 9, dealing in a similar manner with horses, sheep, beef cattle and swine. Prerequisite, Course 9. Seniors; 3 lectures. Credit, 3. Assistant Professor Quaife.

11. Herd and Stud-book Study. — An advanced course in the study of the breeds of live stock, familiarizing the student with the detailed history of the breed, the most productive sires and dams of the various breeds, and the successful lines and methods of breeding. Prerequisites, Animal Husbandry 5 and 8. Seniors; 2 hours. Credit, 3. Professor McNutt [?]

12. Seminar. — Advanced study upon questions pertaining to live stock and live stock production. Each student electing this work will choose some particular line of work in which he is specially interested, and will pursue study in this subject by reading, compilation and research. There will be no regular lecture period, but seminars will be held. A satisfactory report of the results must be presented in a thesis. Open only to seniors majoring in animal husbandry. Credit, 1. Professor McNutt.

DAIRYING.

Professor Lockwood, Assistant Professor Jamison, Mr. Coons, Mr. Baldinger.

Elective Courses.

1. Milk and Milk Composition. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems. Two lecture hours and 1 2-hour laboratory period. Credit, 3.

Assistant Professor Jamison and Chemistry Department.

2. Buttermaking. — A study of separators and cream separation; handling milk and cream for buttermaking; preparation of starters, and ripening

cream; churning; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof. Prerequisite, Course 1. One lecture hour and 2 2-hour laboratory periods. Credit, 3. Professor Lockwood, Assistant Professor Jamison, Mr. Coons.

3. Milk Products. — The manufacture of milk products other than butter, including cheddar cheese, soft and fancy cheese, ice cream, condensed milk, casein, milk powder, etc. Laboratories, largely the making of soft and fancy cheese and ice cream. Prerequisite, Dairying 1. Two lecture hours and 1 2-hour laboratory period. Credit, 3. Mr. Baldinger.

4. Market Milk. — A study of market milk conditions; extent and development of the business; supply and delivery; food value of milk and its uses as food; milk and its relation to the public health; proper methods for handling milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection. Prerequisite, Dairying 1. Two lecture hours and 1 2-hour laboratory period. Credit, 3.

Professor Lockwood, Assistant Professor Jamison.

6. Dairying. — A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary buttermaking; proper methods of handling milk and cream; and the relation of market milk to the public health. One lecture hour and 2 2-hour laboratory periods. Credit, 3.

Assistant Professor Jamison and Mr. Baldinger.

FARM ADMINISTRATION.

Professor Foord, Mr. Peacock.

Elective Courses.

3. Farm Buildings and Machinery. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisites, Agronomy 1, Animal Husbandry 2, Physics 1. Primarily for seniors; 2 laboratory periods and 1 lecture hour. Credit, 3.

Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3, Animal Husbandry 2 or 3. Primarily for seniors; 2 lecture or recitation hours and 1 laboratory period. Credit, 3. Professor Foord.

POULTRY HUSBANDRY.

Professor Graham, Dr. Goodale, Mr. Payne.

Elective Courses.

1. Elements of Poultry Culture. — This course consists of a comprehensive study of poultry-house construction, poultry-house equipment, feeds and feeding, winter-egg production, types and breeds of poultry. Juniors; 2 lectures. Credit, 2. Professor Graham.

2. Elements of Poultry Culture. — This is a continuation of Course 1, treating the subjects of incubation, brooding, care of growing stock, breeding, market poultry, including capons, roasters and broilers, and diseases of poultry. Juniors; 2 lectures. Credit, 2. Professor Graham.

3. Poultry Practice Work. — This is a practical laboratory course in poultry carpentry, caponizing, killing and picking; dressing and packing poultry, sorting and preparing eggs for market. Must be preceded or accompanied by Course 1. Juniors; 1 laboratory period. Credit, 1. Mr. Payne.

4. Incubation and Brooding. — In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg, and the care of sitting hens. This course must be preceded or accompanied by Course 2. Juniors; time to be arranged. Credit, 1 to 3. Mr. Payne.

6. Poultry Management. — A detailed study of large poultry farms and equipment, such as bone cutters, feed cutters, cramming machines, etc.; the laying out and planning of poultry buildings of all kinds; mating of fowls; attention to poultry diseases and investigation work carried on by experiment stations is prominent. A few good poultry plants will be visited by the class for practical demonstrations. Prerequisites, Courses 1, 2, 3, 4, 7, 9 and 10. Seniors; 2 lectures, 1 laboratory period. Credit, 3. Professor Graham and Mr. Payne.

7. Advanced Poultry Judging. — This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text. Prerequisites, Courses 1, 2, 3, 4 and 5. Seniors; 1 lecture and 2 laboratory periods. Credit, 3. Mr. Payne.

8. Investigational Work. — This course is designed especially for students who are planning to do experiment station work. Students will be assigned specific problems to work out experimentally, or they may be required to assist in carrying on such work. Credit, 1 to 3. Dr. Goodale.

9. Market Poultry and Poultry Products. — This course includes the study of market classifications of poultry, eggs and feathers; the requirements of different markets, methods of marketing, advantages and disadvantages

of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course. Prerequisites, Courses 1, 2 and 3. Seniors; 1 lecture or conference period and laboratory periods to be arranged. Credit, 3. Mr. Payne.

10. Pen Management. — This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls, and profit and loss. Prerequisite, Course 1. Juniors; time to be arranged. Credit, 1.
Mr. Payne.

RURAL ENGINEERING.

Professor Gunness.

Elective Courses.

3. Farm Structures. — Study of the strength, durability and cost of building materials; water supply; lighting and heating systems for the farm; drawing plans, writing specifications and estimating the cost of buildings; concrete construction as applied to foundations, silos, tanks, posts, floors and walks. One lecture and 2 laboratory periods. Credit, 3.
Professor Gunness.

4. Farm Machinery. — Study of the care and operation of tillage, seeding, harvesting, pumping and spraying machinery; steam and gas engines. Special attention will be given to the use of power on the small farm. Practice in the adjustment of the various machines, babbitting and fitting bearings, lining shafts and pulleys, lacing belts, splicing rope and packing valves. One lecture and 2 laboratory periods. Credit, 3. Professor Gunness.

5. Power Machinery. — Steam and gasoline engines, refrigerating machinery, electric motors and dynamos. Practice in pipe fitting, soldering, babbitting and fitting bearings, lacing belts and packing valves. Course 5 is intended primarily for dairy students, but would be valuable to any man who would expect to use engines, pumps or electrical machinery. One lecture and 2 laboratory periods. Credit, 3. Professor Gunness.

6. Farm Mechanics. — A general study of the farm equipment; farm buildings, their location, plan and arrangement; water supply; sewage disposal; lighting and heating systems; farm power and farm machinery. Course 6 has been planned for the benefit of those students who want a general course in farm mechanics but cannot spend the time to take the two courses, 3 and 4. One lecture and 2 laboratory periods. Credit, 3. Professor Gunness.

DIVISION OF HORTICULTURE.

Professor Waugh.

[The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.]

2. Nursery Practice. — This course treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums. Sophomores; 1 lecture period and 1 laboratory period. Credit, 2. Assistant Professor Thompson.

Elective Courses (General).

3. Plant Materials. — This course aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work and with the methods of propagating them. Prerequisite, Horticulture 2. Two lecture periods and 1 laboratory period. Credit, 3. Assistant Professor Thompson.

4. Plant Materials. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Prerequisite, Horticulture 3. Two lecture periods and 1 laboratory period. Credit, 3. Assistant Professor Thompson.

6. Plant Breeding. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Open only to students well prepared in agricultural or horticultural subjects. Seniors and graduates; 2 lecture periods and 1 2-hour laboratory period. [Not given in 1915–16.] Credit, 3.

FLORICULTURE.

Associate Professor Nehrling, Mr. Thurston.

Elective Courses.

1. Greenhouse Management. — This course is designed to familiarize students with the methods followed in the management of greenhouse crops. The students are instructed in the practical operations of watering, potting, fumigating, ventilating and in the methods of propagation of plants by seed

and cuttings. They will also be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 2 lectures, 6 laboratory hours. Credit, 5.

Associate Professor NEHRLING and Mr. THURSTON.

2. GREENHOUSE MANAGEMENT. — Continuation of Course 1. In addition, work in the use of cut flowers and plants in decorative work, the arrangement of flowers in baskets, designs, vases, table and home decorations will be considered. Juniors; 2 lectures, 6 laboratory hours. Credit, 5.

Associate Professor NEHRLING and Mr. THURSTON.

3. COMMERCIAL FLORICULTURE. — A detailed study will be made of the methods cultural for greenhouse plants and cut flowers for wholesale and retail markets. The care and marketing of all florists' crops will also be considered. Assigned readings on these topics. Prerequisites, Floriculture 1 and 2. Seniors; 2 lectures, 4 laboratory hours. Credit, 4.

Associate Professor NEHRLING.

4. COMMERCIAL FLORICULTURE. — As stated under Course 3. Prerequisites, Floriculture 1, 2 and 3.

5. GREENHOUSE CONSTRUCTION. — The location, arrangement, construction, cost, heating and ventilating of greenhouse structures; also the drawing of plans and drafting of specifications for commercial houses and private ranges. Such practical work as glazing, the construction of concrete benches and cold frames will be included in this course. Should be taken with Floriculture 1. Juniors; 2 lectures, 2 laboratory hours. Credit, 3.

Associate Professor NEHRLING and Mr. THURSTON.

6. GARDEN FLOWERS AND BEDDING PLANTS. — This course aims to make the student familiar with those annuals, herbaceous perennials, bulbs and bedding plants used in landscape work. Their propagation, culture and uses will be considered. Assigned readings and field trips. Two lectures, 3 laboratory hours. Credit, 3.

Associate Professor NEHRLING and Mr. THURSTON.

7. CONSERVATORY WORK AND DECORATIVE PLANTS. — A study of the tropical and subtropical foliage and flowering plants used in conservatory work. Their arrangement and care will also be considered. Assigned readings. Should be taken with Course 4. Prerequisites, Floriculture 1, 2 and 3. Two lectures, 2 laboratory hours. Credit, 3. Associate Professor NEHRLING.

FORESTRY.

Professor CLARK.

Elective Courses.

1. PRINCIPLES OF FORESTRY. — A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Juniors and seniors; not required of students who propose to major in forestry. Two lectures. Credit, 2.

Professor CLARK.

2. Wood Technology. — A study of the commercial woods found in the lumber markets, methods of identification, uses, strength values, technical qualities, decay and methods of preservation. Juniors; 1 lecture and 2 laboratory periods. Credit, 3. Professor Clark.

3. Dendrology. — During the first part of the semester frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Juniors; 2 2-hour periods; lectures, recitations, laboratory or field work at option of instructor. Credit, 3. Professor Clark.

4. Silviculture. — Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting. Prerequisite, Forestry 3. Juniors; 3 lectures weekly until May 1; during May and June, 1 lecture and 1 4-hour field period weekly. Credit, 3. Professor Clark.

5. Forest Mensuration. — Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating. Seniors; 3 lectures, 72 hours of field work. Credit, 5. Professor Clark.

6. Seminar — Report. — This may involve research, laboratory or field work in the investigation of some subject, together with a review of the literature relating to it and an original written report evidencing the results. Subject to be chosen in conference with Professor Clark. Seniors. Credit, 3. Professor Clark.

LANDSCAPE GARDENING.

Professor Waugh, Assistant Professor Harrison.

Elective Courses.

1. Elements of Landscape Gardening. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 6 hours a week. Credit, 3. Assistant Professor Harrison.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1.

3. General Design. — Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports on individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 6 hours. Credit, 3. Assistant Professor Harrison.

4. General Design. — As stated under Course 3. Prerequisite, Course 3.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2. Professor Waugh.

6. Architecture. — The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing; 2 hours. (Alternating with Course 10 and not to be given in 1915–16.) Credit, 2.
Assistant Professor Harrison.

7. Civic Art. — The principles and applications of modern civic art, including city planning, city improvement, village improvement and rural improvement with special emphasis upon country planning. Prerequisites, Courses 1, 2 and 3; must be followed by Course 8. Six hours. Credit, 3.
Professor Waugh.

8. Civic Art. — As stated under Course 7. Prerequisite, Course 7.

10. Construction and Maintenance. — Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc. (Alternating with Course 6.) Two hours. Credit, 2. Assistant Professor Harrison.

MARKET GARDENING.

Professor Tompson, Assistant Professor Thomson.

Elective Courses.

2. Elements of Market Gardening. — A course designed for an introduction to market gardening as a business. The work consists primarily of actual field experience in handling vegetable crops from seed to maturity. This is supplemented with lectures and text-book, in which a study of methods, soils, fertilization, tillage and management is made. Juniors; 5 hours. Credit, 3. Assistant Professor Thomson.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3. Assistant Professor Thomson.

POMOLOGY.

Professor Sears, Associate Professor Chenoweth.

Elective Courses.

1. Practical Pomology 1. — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery stock, pruning, culture of orchards, orchard fertilizers, cropping orchards, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 4 hours. Credit, 3. Professor Sears.

2. Practical Pomology 2. — As stated under Course 1. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 4 hours. Credit, 3. Professor Sears.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 4 hours. Credit, 3. Associate Professor Chenoweth.

4. Systematic Pomology. — As stated under Course 3. Prerequisites, Horticulture 2 and Pomology 1, 2 and 3. Seniors; 4 hours. Credit, 3.

5. Commercial Pomology. — The picking, handling, storing and marketing of fruits, including a discussion of storage houses, fruit packages, methods of grading and packing, manufacturing, etc. Especial emphasis is placed upon laboratory and field work, where the student is given actual practice in the picking and packing of all the principal fruits, together with the manufacture of by-products. Open only to men majoring in pomology. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 1 lecture and 2 laboratory periods. Credit, 3. Associate Professor Chenoweth.

6. Spraying. — A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small fruit plantations. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 3 hours. One lecture period and 1 laboratory period. Credit, 2. Professor Sears.

DRAWING.

Mr. Root.

Elective Courses.

1. Free-hand Drawing. — Lettering; free-hand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink. Juniors; 6 hours. Credit, 3.

Mr. Root.

2. Mechanical Drawing. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry. Juniors; 6 hours. Credit, 3.

Mr. Root.

DIVISION OF SCIENCE.

Professor Henry T. Fernald.

BOTANY.

Professor Stone,[1] Associate Professor Osmun, Assistant Professor Anderson, Mr. McLaughlin, Mr. Smith, Mr. Doran.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held weekly, wherein new problems in botanical science are considered by graduate students and the seniors who elect botany. A complete revision of the courses offered by the department will appear in the spring supplement of this catalogue.]

Required Course.

2. General Botany. — The morphology, physiology and classification of plants. This course is fundamental. Its aim is to lay a foundation for the more specialized courses in botany which follow, and to provide a general knowledge of the science for those students who will not take further work in the department. This course is prerequisite to all other courses given by the department. In the laboratory much time is devoted to study of the structure of higher or seed plants. In this work first attention is given to the cell as the unit of structure; from the cell is traced the gradual development of the tissues of the entire plant. During the spring period of the semester much practice is given in determining and naming plants, Gray's "New Manual of Botany" being employed. In connection with this work each student is required to collect and prepare an herbarium of 75 species of plants. The lectures aim to amplify and interpret the laboratory work, dealing also with the function (physiology), classification (taxonomy) and ecology of plants. Though only 1 lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 1 lecture and 3 laboratory periods. Credit, 4.

Associate Professor Osmun, Mr. McLaughlin, Mr. Smith and Mr. Doran.

Elective Courses.

3. Cryptogamic Botany. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in any of the biological sciences, and is a prerequisite of Courses 9, 10, 15 and 16. Students electing this course may attend the lectures in Course 5. Prerequisite, Course 2. Primarily for juniors; 1 lecture hour and 3 2-hour laboratory periods. Credit, 4. Mr. McLaughlin.

4. Cryptogamic Botany. — As stated in Course 3. Prerequisite, Course 3. One lecture hour and 2 2-hour laboratory periods. Credit, 3.

[1] Absent on leave; Associate Professor Osmun acting as head of department.

5. Diseases of Crops. — This course comprises a study of the common diseases of crops, their nature, causes and methods of prevention and control. In the laboratory macroscopic examinations of diseases are made, and the principal experiment-station and government literature on plant diseases is read. Intended especially for students majoring in agronomy, floriculture, landscape gardening and pomology. Prerequisite, Course 2. Primarily for juniors; 1 1-hour lecture and 1 2-hour laboratory period. Credit, 2.
Assistant Professor Anderson, Mr. McLaughlin and Mr. Smith.

7. Diseases of Crops. — This course is more specialized than Course 5, and is intended to meet the needs of the student who wishes to make a more thorough study of the diseases of the particular group or groups of crops in which his interest lies; *e.g.*, diseases of fruits, diseases of field crops, diseases of trees and shrubs. Laboratory work consists of microscopic and macroscopic examination of diseases, and extensive reading of literature concerning them. Prerequisite, Course 2. Students taking this course who have not previously taken Course 5 will attend the lectures in Course 5, and if they continue in botany the second semester, must take Course 8. Seniors; 1 lecture and 3 2-hour laboratory periods. Credit, 4. Assistant Professor Anderson.

8. Diseases of Crops. — As stated in Course 7. Prerequisite, Course 7.

9. Plant Pathology. — This course embraces a comprehensive study of diseases of plants, including detailed training in laboratory methods and technique. Much time is devoted to the study of literature and representative life histories of pathogens, the making of pure cultures, and artificial inoculation of hosts. Students taking this course are fitted for civil service, experiment-station and college positions in plant pathology. Course 10 must follow. Prerequisites, Botany 2, 3 and 4. Seniors; 1 lecture and 4 2-hour laboratory periods. Credit, 5. Associate Professor Osmun.

10. Plant Pathology. — As stated in Course 9. Prerequisite, Course 9.

11. Plant Physiology. — This is a general course dealing with such topics as absorption, nutrition, growth, movement and the tropisms of plants, and requires previous training in organic chemistry and botany. Prerequisite, Botany 2. Seniors; 1 lecture and 3 2-hour laboratory periods. Credit, 4.
Assistant Professor Anderson and Mr. Doran.

12. Plant Physiology. — As stated in Course 11. Prerequisite, Course 11.

13. Shade-tree Management. — Physiology and pathology of shade-trees. This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade-trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Prerequisite, Courses 2 and 5. Must be followed by Course 14. Seniors; 1 lecture period and 3 2-hour laboratory periods. Credit, 4. Mr. Smith.

14. Shade-tree Management. — Physiology and pathology of shade-trees, as stated in Course 13. Prerequisite, Course 13.

15. Histological Technique. — This course comprises training in general histological methods, including the use of precision microtomes and various methods of killing, fixing, sectioning, staining and mounting of plant materials. This is a technical course in histology, of value to students intending to become research or teaching botanists. It is recommended for students taking Courses 9 and 10, as an aid to the study of relationship between host and parasite, and is open to those taking Courses 13 and 14, who desire to make their studies in tree structure more comprehensive. Collateral reading and conferences. Prerequisites, Botany 2, 3 and 4. Seniors; 3 or 5 2-hour laboratory and conference periods. Credit, 3 or 5.

Associate Professor Osmun.

16. Histological Technique. — As stated in Course 15. Prerequisite, Course 15.

GENERAL AND AGRICULTURAL CHEMISTRY.

Professor Lindsey, Professor Wellington, Professor Chamberlain, Associate Professor Peters, Associate Professor Anderson, Mr. Serex, Mr. Erichsen, Mr. MacNeil, Mr. Perry, Mr. Phillips.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the other sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and intending following chemistry as a vocation are prepared for positions as instructors in high schools and colleges in the agricultural experiment stations, the United States Department of Agriculture, as well as in fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take graduate work leading especially to the degree of M.Sc., and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.]

Required Courses.

1A. General Chemistry. — An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds. Text-book, Kahlenberg's "Outlines of Chemistry." This course is for those students who do not present chemistry for entrance, and who begin the subject in college. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor Peters, Mr. Serex, Mr. Erichsen and Mr. Perry.

1B. Advanced General Chemistry. — A review of the fundamental chemical laws, together with the common acid and base-forming elements and their compounds. Text-book, Kahlenberg's "Outlines of Chemistry." The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate, superphosphate, muriate and sulfate of potash, arsenate of lead, Paris green, Bordeaux mixture, lime-sulfur and

emulsions. In addition to these, preparations outlined in Blanchard's "Synthetic Inorganic Chemistry" are made. This course is for students who present chemistry for entrance. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor ANDERSON, Mr. SEREX, Mr. ERICHSEN and Mr. PHILLIPS.

2A. GENERAL CHEMISTRY. — A continuation of Course 1A. A study of metals and their compounds. The laboratory work is the same as described under 1B. Associate Professor PETERS and Assistants.

2B. INORGANIC AGRICULTURAL CHEMISTRY. — A study of the chemical composition, properties and reactions of soils, fertilizers, fungicides and insecticides, and the common materials of construction, such as tile, brick, cements, paints, etc. Text-book, Fraps' "Principles of Agricultural Chemistry." The laboratory work is divided into three parts, as follows: (*a*) qualitative examination of soil, plant ash and superphosphate; (*b*) approximate quantitative determination of moisture, ash, carbonic acid, phosphoric acid, potash, etc.; (*c*) special work on retention of salts by soil, leaching of lime from the soil by carbonated water, etc. Prerequisite, Course 1B. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor ANDERSON and Assistants.

Elective Courses.

3. QUALITATIVE ANALYSIS. — *Basic.* — A course in the systematic analysis of metallic salts, presented from the ionic viewpoint. The student studies closely the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Böttger's "Qualitative Analysis" and Treadwell-Hall's "Qualitative Analysis" for reference. Prerequisite, Course 2; should be taken, particularly, by all intending to follow chemistry as a vocation. Sophomores; lecture, 1 hour; laboratory, 4 hours. Credit, 3.

Associate Professor ANDERSON and Mr. PHILLIPS.

4. QUALITATIVE ANALYSIS. — *Acidic.* — A continuation of Course 3. A large part of the semester is spent in the examination qualitatively of minerals and of agricultural products. Prerequisite, Course 3. Sophomores; lecture, 1 hour; laboratory, 4 hours. Credit, 3.

Associate Professor ANDERSON and Mr. PHILLIPS.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured

from them. These include alcohols, acids, esters, fats, carbohydrates, proteins, etc. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for future work in agricultural chemical investigation. Prerequisites, Courses 1, 2, 3 and 4 (Courses 3 or 4 will not be required as prerequisites for those majoring in other courses than chemistry). Juniors; those electing Course 5 are expected to elect Course 6; lectures, 3 hours; laboratory, 4 hours. Credit, 5.

Professor Chamberlain and Mr. Perry.

6. As stated under Course 5.

[Agricultural Chemistry. — The two following courses in general agricultural chemistry are designed especially for students majoring in the different departments of the Divisions of Agriculture and Horticulture, and every effort is made to meet the demands of these departments. They are for students in practical agriculture, and not for those intending to take up scientific lines of work. They form an alternative group with either Courses 3 and 4 or 5 and 6.]

7. Inorganic Agricultural Chemistry. — The same as Course 2B. This course is designed for those men who have had only Courses 1A and 2A. Prerequisites, Courses 1A and 2A. Juniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3. Associate Professor Anderson and Mr. Phillips.

8. Organic Agricultural Chemistry. — The course embraces the study of the most important groups of organic compounds of plants and animals, the composition of plants, the chemistry of plant growth, plants as food and as industrial material, the composition of animals, the chemistry of digestion, absorption and metabolism, animal nutrition, animal foods, rations, etc., and also the study of some of the products related to plants and animals, such as milk, butter, cheese, sugar, alcohol, wood pulp and paper. The treatment of the subject will be general, avoiding (so far as possible) complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the general chemistry of plants and animals and agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Professor Chamberlain and Mr. Perry.

9. Quantitative Analysis. — Instruction in this course includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals in minerals and industrial products. Aside from teaching accurate observation and care in manipulation, it is intended for those who would learn the exact methods for determining the elements, particularly, in inorganic substances, and is the forerunner of other courses intended to fit men to become expert analysts. Talbot's "Quantitative Chemical Analysis" is used as a text. Prerequisites, Courses 1, 2 and 3 or 4. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor Wellington, Associate Professor Peters and Mr. MacNeil.

10. Agricultural Chemical Analysis. — In this course and Course 11 the methods previously studied, and other approved methods, are applied to the examination of agricultural materials. The analysis of fertilizers, in-

secticides, fungicides and soils is followed by that of cattle foods, dairy products, sugars, starches and allied substances. Prerequisite, Course 9. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON, Associate Professor PETERS and Mr. MACNEIL.

11. AGRICULTURAL CHEMICAL ANALYSIS. — As stated under Course 10. Prerequisite, Course 10. Seniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5. Associate Professor PETERS and Mr. MACNEIL.

12, 14 and 16. See below, following Course 15.

13. PHYSIOLOGICAL CHEMISTRY. — This course is intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work in microbiology, botany, agronomy, animal husbandry, etc., and who have had Courses 5 and 6, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 5 and 6 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory, experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion. The course gives additional training in the chemical problems of agricultural experiment-station work, especially those connected with investigations in animal and plant nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Courses 7 and 8. Prerequisites, preferably, Courses 5 and 6 or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3. Professor CHAMBERLAIN and Mr. PERRY.

15. PHYSICAL CHEMISTRY. — A résumé of general chemistry from the viewpoint of physical chemistry and the application of physical chemistry to agricultural chemistry. Prerequisite, Course 9. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor ANDERSON and Mr. PHILLIPS.

[GENERAL STATEMENT CONCERNING COURSES 12, 14 AND 16. — Each student electing either of these courses will be required to take up and follow out some special line of work, the object being to acquaint him with methods of original inquiry. A single concrete example may be found in a comparative study of the different methods for the determination of the several forms of nitrogen. A thesis may not be required, but frequent consultation of the literature bearing on the subject will be necessary. These courses are valuable for all chemists, and particularly so for those intending to take up experiment-station work. A student may choose any one but not two of these separate courses.]

12. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS. — The student is given a problem to solve either in analytical chemistry or related to the agricultural industries. This will acquaint him with the methods used in research and with the literature, and show him how to handle problems in this field of chemistry when occasion arises.

Associate Professor PETERS.

14. Special Work in Physiological and Organic Agricultural Chemistry. — In this course, as in Courses 12 and 16, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, the chemical study of dairy products, etc. Prerequisites, Courses 5, 6 and 13. Seniors; laboratory, 10 hours. Credit, 5.

Professor Chamberlain.

16. Special Work in Physical Chemistry. — The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student will select one line of work and follow it through the course, repeating some of the original work. Prerequisite, Course 15. Laboratory, 10 hours. Credit, 5.

Associate Professor Anderson.

18. History of Chemistry. — An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at greater length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course. Seniors; lectures, 2 hours. Credit, 2.

Professor Wellington.

ENTOMOLOGY.

Professor Fernald, Professor Crampton, Associate Professor Gates, Dr. Regan.

Elective Courses.

1. General and Economic Entomology. — Course 1 comprises a general introduction to the study of insects, including studies on their structure as applied to their identification; the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collections, and methods for their control. The most important insecticides and their preparation and application are also treated. Students electing Course 1 are expected to take Course 2. Juniors; 3 lecture periods. Credit, 3. Professor Fernald.

2. General and Economic Entomology. — A continuation of Course 1, with laboratory and field work on methods of collecting, preserving and studying insects and their work. Prerequisite, Entomology 1. Juniors; 2 laboratory or field periods. Credit, 2. Professor Fernald.

3. Advanced Entomology. — This course is subdivided, the time spent on the various subdivisions differing somewhat according to the particular needs of those taking it; and it is to a large degree given in the form of in-

dividual instruction, special attention being paid to the pests attacking the particular crops in which the student is most interested. The student may specialize in fruit pests, market-garden pests, greenhouse pests, field crop pests, etc., to a large extent, in accordance with his plans for future work.

A. Morphology. — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. Histology. — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

C. Insecticides and Apparatus. — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects; tests for detecting adulterations; comparative tests of nozzles and other apparatus; and a study of other methods of insect control, together with laboratory work.

D. Coccidology. — Lectures and laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

E. Bibliography. — Studies of the various entomological publications and of the methods of finding the literature on any insect.

F. Special Studies. — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing Course 3 are expected to take Course 4; 1 1-hour lecture period and 3 2-hour laboratory or field periods. Credit, 4. Professor Fernald and Associate Professor Crampton.

4. Advanced Entomology. — As stated in Course 3. Prerequisite, Course 3.

5. Forest and Shade-tree Insects. — A study of the insects injurious to forest and shade-trees, and of methods for their control, with laboratory and field work on these insects, and a study of what has been published about them. Seniors; prerequisites, Entomology 1 and 2; 1 lecture and 2 2-hour laboratory or field exercises. Credit, 3. Professor Fernald.

8. Beekeeping. — This course comprises a general consideration of the biology of the honeybee and the elements of practical beekeeping. Some topics covered are: life history, general behavior and instincts, structure, products, relations of bees to plants, the honey flora. The course aims particularly to afford first-hand, practical experience with bees, to the end of enabling their proper maintenance for any purpose, horticultural, educational or apicultural. Bee diseases, a thorough understanding of which is fundamental, are emphasized. So far as possible the work is made individual in con-

structing materials and apparatus and in the manipulation of bees. Juniors; seniors may elect; Courses 1 and 2 form a desirable preparation; 2 lectures, 1 2-hour laboratory period. Credit, 3. Associate Professor GATES.

10. ADVANCED BEEKEEPING. — This course deals with the advanced and special problems of the beekeeper. Besides considering those difficulties which at present confront the industry, subjects necessarily of limited treatment in the previous course are expanded for the development of particular technique and manipulation. Apiary management, including the principles of queen rearing, are practiced. The course should further qualify for apicultural instruction and inspection service, affording familiarity with the special literature and methods needed in investigation and research. The policy of individual instruction is continued in so far as practicable. Primarily for seniors, but juniors may elect; prerequisite, Course 8; 1 lecture, 1 2-hour laboratory period. Credit, 2. Associate Professor GATES.

11. EVOLUTION. — In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the appearance of man; his future in the light of his past development; and the evolution of human institutions and ideas. Consideration is also given to the theories concerning the factors of evolution, the general problems of heredity and similar topics. The course closes with a brief discussion of the philosophical, moral and social aspects of the problems involved, and the influence of the idea of evolution upon modern thought. The lectures are supplemented by collateral reading; and a portion of the time is used for the purpose of demonstration, or discussion by the class. Seniors; juniors may elect; 2 lecture periods. Credit, 2. Professor CRAMPTON.

MATHEMATICS AND CIVIL ENGINEERING.

Professor OSTRANDER, Assistant Professor DUNCAN, Assistant Professor MACHMER, Mr. HAZELTINE.

Required Courses.

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra." Freshmen; 3 hours a week. Credit, 3.

Assistant Professor DUNCAN, Assistant Professor MACHMER and Mr. HAZELTINE.

2. HIGHER ALGEBRA. — As stated under Course 1, but for two hours only. Credit, 2.

3. Solid Geometry. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours a week. Credit, 2.

Assistant Professor Duncan, Assistant Professor Machmer and Mr. Hazeltine.

4. Plane Trigonometry (in charge of Department of Physics). — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Freshmen; 3 hours. Credit, 3. Professor Hasbrouck and Assistant Professor Robbins.

Elective Courses.

5. Mensuration and Computation. — The course includes a review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule. Also the graph, mensuration of plane and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of woodworking; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements. Primarily for juniors; 3 hours. Credit, 3.

Assistant Professor Machmer.

6. Plane Surveying. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.

Professor Ostrander, Assistant Professor Duncan, Assistant Professor Machmer and Mr. Hazeltine.

7. Analytic Geometry. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2, 3 and 4. Primarily for juniors; 3 hours a week. Credit, 3.

Professor Ostrander.

8. Differential and Integral Calculus. — A first course in the subject, with some of the more important applications. Davis's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 3, 4 and 7. Primarily for juniors; 5 hours. Credit, 5. Assistant Professor Duncan.

10. Roads and Railroads. — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures; 6 hours. Credit, 5. Professor Ostrander.

11. Hydraulics and Sanitary Engineering. — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures; 3 hours. Credit, 3.
Professor Ostrander.

12. Elementary Structures. — An elementary course in roofs and bridges. Text-book and lectures; 6 hours. [Not given in 1915–16.] Credit, 5.
Professor Ostrander.

13. Materials of Construction, Foundations and Masonry Construction. — Text-book and lectures; 4 hours. [Not given in 1915–16.] Credit, 3.
Professor Ostrander.

15. Applied Mechanics. — A course in applied mechanics, based on the calculus, with problems. Text-books and lectures. Prerequisite, Mathematics 8. Three hours. Credit, 3.
Professor Ostrander.

MICROBIOLOGY.

Professor Marshall, Associate Professor van Suchtelen, Mr. Itano, Mr. Avery.

[Courses 1 and 3 (repeated in 2 and 4) are especially adapted to those who wish a general, comprehensive, although elementary, survey of agricultural microbiology.]

Elective Courses.

1. Morphological, Cultural and Physiological Microbiology. — Types of micro-organisms, technic of handling, methods of culture and functions of micro-organisms are considered. This course is elementary and fundamental to all applied and special microbiological studies, and therefore is made a prerequisite to all courses offered; 2 hours or 2 credits are assigned to lectures, text-book requirements and recitations; this time will be scheduled. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 5.
The Department.

2. As stated under Course 1, which it repeats.

3. Agricultural Microbiology. — This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices. These subjects will be demonstrated by illustrative and typical laboratory exercises, which for each subject, on account of time limitations, must be very elementary and greatly restricted. Prerequisite, Microbiology 1 or 2. Two hours or 2 credits are assigned to lectures, text-book requirements and recitations; this time will be scheduled. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 5.
The Department.

4. As stated under Course 3, which it repeats.

5. Advanced Morphological, Cultural and Physiological Microbiology. — The purpose of this course is to prepare the student for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technic and methods of culture, together with a more extensive knowledge of micro-organisms and their functions. Prerequisites, Microbiology 1 or 2, 3 or 4, and Chemistry 5 and 6. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors in the fall and spring semesters. Credit, 3.

The Department.

6. As stated under Course 5, which it repeats.

7. Advanced Agricultural Microbiology. — A knowledge of the subjects mentioned in Courses 3 and 4 cannot be obtained without a more extensive training in microbiological practices, as found in Courses 5 and 6. Prerequisites, Microbiology 1 or 2, 3 or 4 and 5 or 6, and Chemistry 5 and 6. Six hours or 3 credits are assigned to the laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors in the fall and spring semesters. Credit, 3.

The Department.

8. As stated under Course 7, which it repeats.

9. Soil Microbiology. — Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention. Prerequisite, Microbiology 1 or 2. Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 3.

The Department.

10. As stated under Course 9, which it repeats.

11. Dairy Microbiology. — Special emphasis will be placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk; bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered. Prerequisites, Microbiology 1 or 2, and Dairying 1 (see Dairying 3). Six hours or 3 credits are assigned to laboratory exercises; only 1 hour of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 3.

The Department.

12. As stated under Course 11, which it repeats.

13. Food Microbiology. — A study of food preservation by means of drying, canning, refrigerating and addition of chemicals will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased foods, will receive consideration. Contamination of food supplies by means of water, handling, exposure, diseased persons, etc., is of especial significance and will be demonstrated by laboratory exercises. Prerequisite, Microbiology 1 or 2. Six hours or 3 credits are assigned to laboratory exercises; only 1 of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 3. The Department.

14. As stated under Course 13, which it repeats.

15. Hygienic Microbiology. — An attempt will be made to select for this course certain material which should be the possession of every individual, and which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antisepsis and asepsis will be treated. Prerequisite, Microbiology 1 or 2. Six hours or 3 credits are assigned to laboratory exercises; only 1 of the 6 is scheduled; the remaining 5 hours are arranged with the instructor. Open to juniors and seniors. Credit, 3.
The Department.

16. As stated under Course 15, which it repeats.

PHYSICS.

Professor Hasbrouck, Assistant Professor Robbins, Mr. Thompson.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

Required Course.

1. General Physics: Mechanics of Solids and Fluids, Wave Motion and Heat. — The following topics are chosen for the required work because they are regarded as the most fundamental of all, and there is no part of the work in physics more necessary for the student who plans to take up practical farming: Statics, with equilibrium of rigid body, work, energy and friction; kinetics, considering rectilinear motion and motion in a curved path; harmonic motion; rotation of rigid bodies, including kinematics of rotation; liquids and gases, with properties of fluids at rest and in motion; properties of matter and its internal forces, including elasticity, capillarity, surface tension; heat, including thermometry, calorimetry and specific heat, transmission of

heat, changes of state, radiation and absorption. Course given by text-book and lectures. Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5.

Professor Hasbrouck, Assistant Professor Robbins and Mr. Thompson.

Elective Courses.

2. General Physics: Electricity and Light. — The work in electricity includes such subject-matter as magnetism, electrostatics, electric currents with their production, chemical, heating and mechanical effects; battery cells, measurement of voltage, current flow and resistance, motors and generators. In "light" there is included photometric measurements of the intensity of light, refraction, reflection and dispersion of light, lenses, prisms and optical instruments; analysis of light and polarization. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.

Assistant Professor Robbins and Mr. Thompson.

3. Electricity, Heat and Light. — Three-hour lecture and laboratory course open to juniors and seniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Assistant Professor Robbins.

4. Continuation of Course 3, open to juniors and seniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Assistant Professor Robbins.

[Mathematics 4 (trigonometry) is, for convenience of grouping, listed under mathematics, although in charge of the Department of Physics.]

VETERINARY SCIENCE.

Professor Paige, Associate Professor Gage.

[The courses in veterinary science have been arranged to meet the needs of students who propose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

1. Veterinary Hygiene and Stable Sanitation. — This course is intended to familiarize the student with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals. Juniors and seniors; 3 hours. Credit, 3. Professor Paige.

2. General Veterinary Pathology, Materia Medica and Therapeutics. — In this course such fundamental and general pathological conditions are studied as inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in the diagnosis, prevention and treatment of disease. The course in pathology is followed by one in materia medica and therapeutics, dealing with the origin, preparation, pharmacology, pharmacy, administration and therapeutic use of the more common drugs. Poisonous plants and symptoms and treatment of plant poisoning are also considered. Juniors and seniors; 3 hours. Credit, 3. Professor Paige.

3. Comparative (Veterinary) Anatomy. — The anatomy of the horse is studied in detail, and that of other farm animals compared with it where differences exist. This course is essential for those students wishing to elect Course 4. Juniors and seniors; 3 hours. Credit, 3. Professor Paige.

4. Theory and Practice of Veterinary Medicine; General, Special and Operative Surgery. — A course intended to familiarize the student with the various medical and surgical diseases of the different species of farm animals. Particular attention is given to diagnosis and first-aid treatment. The student is taught the technic of simple surgical operations that can with safety be performed by the stock owner. This course should be preceded by Course 3, and taken in conjunction with Course 2. Lectures, demonstrations and practice. Juniors and seniors; 3 hours. Credit, 3.

Professor Paige.

5. Essentials of General Pathology. — This course is planned to introduce the student to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis will be considered in the laboratory. The various chemical and biological reactions and tests will be presented from the standpoint of pure science, showing applications of chemistry and biology. The course will serve to liberally educate and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

6. Essentials of General Animal Pathology. — This is a continuation of Course 5, and is devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease will be considered. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

7. Avian Pathology. — A course in poultry diseases. The object of this course is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. The work will consist of a systematic study of the diseases of the alimentary tract, liver and abdominal region, followed by a study of the diseases of the respiratory system, circulation and kidneys. The important disease-producing external and internal parasites will be considered; also diseases of the skin and reproductive organs. Lectures and demonstrations. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor Gage.

8. Avian Pathology. — A continuation of Course 7, devoted to the study of some of the special diseases of poultry. Recent methods used in the control

of these diseases will be considered and opportunity offered the student for demonstrating various disease processes by means of prepared slides. Lectures, demonstrations and laboratory work. Juniors and seniors; 2 3-hour laboratory periods. Credit, 3. Associate Professor GAGE.

ZOÖLOGY AND GEOLOGY.

Associate Professor GORDON, Mr. BLANCHARD.

ZOÖLOGY.

Required Course.

1. ELEMENTARY ZOÖLOGY. — This course presents the underlying principles of biology and the zoölogical part of an introductory course. Laboratory dissection and lectures. Sophomores; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3.

Associate Professor GORDON and Mr. BLANCHARD.

Elective Courses.

3. INVERTEBRATE OR VERTEBRATE ZOÖLOGY. — These are separate courses running throughout the year. The student may elect one or the other, but not both in the same year. The course in invertebrate zoölogy is designed primarily for students who are planning to take up entomology, but is open to any one. The course in vertebrate zoölogy deals with comparative vertebrate anatomy and physiology and is designed for those who desire or require a knowledge of the comparative anatomy and physiology of vertebrated animals. Each course includes laboratory, text-book and lecture work. These courses are scheduled in the junior year, but are open to seniors; hours by arrangement. Credit, 3. Associate Professor GORDON.

4. INVERTEBRATE OR VERTEBRATE ZOÖLOGY. — The continuation and completion of Course 3 of the first semester; hours by arrangement. Credit, 3.

Associate Professor GORDON.

5. ELEMENTS OF HISTOLOGY. — This course gives the theories and methods of preparing normal animal tissues for microscopic examination. Chiefly laboratory work, with reading and occasional seminars. Open to juniors and seniors; hours by arrangement; see below, Course 6. Credit, 2.

Mr. BLANCHARD or Associate Professor GORDON.

6. ELEMENTS OF HISTOLOGY. — In Course 6 the student may carry forward the work of the first semester, thereby completing a year's work, or may take the work outlined for Course 5. Open to juniors and seniors; hours by arrangement. Credit, 2.

Mr. BLANCHARD or Associate Professor GORDON.

7. ADVANCED ZOÖLOGY.[1] — Special elective work in advanced zoölogy is offered to seniors who are interested in zoölogy or who are looking forward to advanced work in any department of zoölogy or allied branches; hours by arrangement. Credit, 5.

Associate Professor GORDON and Mr. BLANCHARD.

8. Advanced Zoölogy.[1] — This course may be a continuation of the work of the first semester or of separate character; hours by arrangement. Credit, 3. Associate Professor Gordon and Mr. Blanchard.

Geology.

Elective Course.

2. Elementary Geology. — Rock-forming minerals; rock types; rock weathering; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 1-hour period and 2 2-hour periods. Credit, 3.
Associate Professor Gordon and Mr. Blanchard.

[1] The work offered in Courses 3, 4, 7 and 8 may apply on a minor for the degrees of master of science or doctor of philosophy.

DIVISION OF THE HUMANITIES.

Professor Sprague.

ECONOMICS AND SOCIOLOGY.

Professor Sprague.

[The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.]

Elective Courses.

1. Political Economy. — An introductory course which takes up the study of the nature and scope of economics, the evolution and organization of the present economic system, and the fundamental principles of production, exchange and consumption. The class will study and discuss such topics as wealth, value, capital, interest, profits, wages and labor, tariffs, trusts, etc. Debates on current economic problems will be organized in the class. Text-book, library readings, lectures and discussions. Arranged primarily for juniors; open to seniors; 3 hours. Credit, 3. Professor Sprague.

2. Industrial Problems. — This is a course in the most important industrial problems of the day, covering the methods of organizations of labor and capital, systems of industrial remuneration, means of securing industrial peace, legal status of labor unions and their activities, protective legislation for workmen and employers, the problems of immigration, the sweated industries, prison labor, child labor and industrial education. Text-book, with collateral readings, lectures and discussion. Three hours. Credit, 3.
Professor Sprague.

4. Anthropology; the History of Human Civilization. — The evolutionary origin and history of man; characteristics of primitive men, departure from the animal status, and the beginnings of civilization; development of industries, arts and sciences; the growth of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern conditions; characteristics of the leading races of the world. These topics will constitute the subject-matter of the course. Arranged for sophomores and juniors; library readings, text-book and lectures; 3 hours. Credit, 3. Professor Sprague.

5. Public Finance, Money and Banking. — This course follows Economics 1. It will take up taxation and the various systems for collecting public revenue in Europe and America, with the problems involved; the history of money and the systems of banking and finance now in operation; the cause and problems of economic crises and depressions; the currency problems of the United States. For juniors and seniors; readings, lectures and discussions; 3 hours. Credit, 3. Professor Sprague.

7. Social Institutions and Social Problems. — This course is devoted to the study of the social institutions, such as the family, the church, State

and property; and to such current social problems as divorce, race suicide, crime and prison reform, poverty and its relief. Considerable time is given to the study of eugenics in its social significance and possibilities. The correctional and charitable institutions of Massachusetts are studied in some detail. The later weeks of the term are devoted to a short introduction to sociological theory. Arranged especially for seniors; open to juniors by permission; readings, lectures, discussions; 3 hours. Credit, 3. Professor Sprague.

8. Modern Social Reform Movements. — The history of property and its vital issues in modern times; the socialistic systems, anarchy and communism; systems of workingmen's insurance in Europe and America, and other methods of relief from the chances of life; educational reforms, in process, to meet the demands of a new age, and legislative remedies for the evils of social change and maladjustment; the crisis of Christianity under modern capitalized industrialism. These topics indicate the nature of the subjects studied. This course is arranged to follow Economics 7. Three hours. Credit, 3.

Professor Sprague.

HISTORY AND GOVERNMENT.

Elective Courses.

1. Elements of Political Science. — Nature and scope of political science; origin and evolution of the State; systems of government in the principal European States; organization and working of the national and of the State governments of the United States; relation of government to political parties and to public opinion; the functions of government as related to labor and commerce. [Withheld in 1915–16.] Three hours. Credit, 3.

2. Local Political Institutions. — A comparative study of the organization, functions and achievements of country and city groups, especially as these are concerned with such matters as taxation, finance, licenses, franchises, public ownership, highways, transportation and communication, water supply, fire protection, public lighting, markets, food inspection, garbage and sewage disposal, infectious diseases, housing conditions, police force, parks and playgrounds, libraries, schools, care of dependents. [Not given in 1915–16.] Three hours. Credit, 3.

3. The History of New England. — This course, treating New England as a unit, aims to give a survey of its political, religious and economic history; to trace the development of its institutions, the growth of its industries, and its influence in national politics and upon the newer sections of the United States. Assigned readings and themes. Juniors and seniors. Three hours. Credit, 3. [1]

5. The History of Ideals. — This course treats history from the idealistic rather than from the economic point of view. It attempts to define the great ideals which have impelled some of the most important social,

[1] Given in 1915 by Miss Jefferson.

political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. [Withheld in 1915–16.] Lectures and reading. Three hours. Credit, 3.

LANGUAGES AND LITERATURE.

Professor Lewis, Associate Professor Neal, Associate Professor Ashley, Associate Professor Mackimmie, Assistant Professor Smith, Assistant Professor Prince, Miss Goessmann, Mr. Harmount, Mr. Julian, Mr. Rand.

English.

Required Courses.

1, 2. Freshman English. — Composition. Recitations, laboratory practice and lectures; theme writing and conferences. Text-book and laboratory manual, Neal's "Thought-Building in Composition." Freshmen; 4 hours. Credit, 4.

Assistant Professor Smith, Assistant Professor Prince and Mr. Rand.

3, 4. Sophomore English. — A general reading course in English literature. Prerequisite, Courses 2 and 3, respectively. Sophomores; 2 hours. Credit, 2. Professor Lewis and Miss Goessmann.

Elective Courses in English Language and Literature.

[The elective courses in English fall into two groups. Both groups are intended to increase the student's appreciation of literature as a means to enjoyment, education and spiritual growth. Group one (Courses 11, 12, 13 and 14) will, besides introducing the student to individual writers, emphasize the life and thought of the times, political, economic and social, in order that the student may realize literature as the expression of individual genius representing (by leading it or summarizing it) the thought and spirit of a period or a social unit. Group two (Courses 15 and 16) will tend more to emphasize form-characteristics, artistic quality or historical development of literary types, or individual great writers. Courses 12, 13A, 14A, 15A and 16 are offered in 1916–17; courses 11A, 12, 13B, 14B, 15B and 16 are offered in 1915–16 and 1917–18.]

11. English Writers and Thought. — A. *From Milton to Pope* (fall of 1915, 1917). — A survey course. It begins with a brief review of the Elizabethan period, and then considers the period of Milton (Caroline literature — Puritanism, the civil wars, Cromwell and the Protectorate), followed by the rapidly changing political and social conditions of the Restoration and then of the Revolution, ending with the Augustan age and Pope, and the temporary predominance of classicism and the intellectual instead of emotional qualities in literature. It will, however, emphasize the leading writers of the periods, including Bacon, Milton, Dryden, Addison and the essayists, Swift and Pope. Much of the literature of these times is closely associated with interesting and most important events in English political, religious and social history that introduce and explain the later modern periods. Juniors and seniors; every second year; 3 hours. [Not given in 1915–16.] Credit, 3.

Assistant Professor Smith.

B. [Withheld.]

12. American Writers and Thought. — Intended to give a general survey of literature in America, especially in the nineteenth century, with an introduction to the work of the best-known writers, and with especial attention to the relations between national life and history and national thought as expressed in literature. The usual authors — Irving, Cooper, Bryant, Poe, Longfellow, Emerson, Hawthorne, Whittier, Parkman, Lowell, Holmes, Whitman, Lanier — will be discussed, and attention will be given to southern and western authors. Present writers and tendencies will also receive notice. Juniors and seniors; 3 hours. [Omitted, 1915–16.] Credit, 3.

Assistant Professor Prince.

13. English Writers and Thought. — A. *Verse from 1744 to 1832* (fall of 1914, 1916). — A course in history, appreciation and understanding. Between the years named we see the rapid decline in formalism and a rapid increase of originality, freedom and emotional quality in literature (romanticism), accompanying the appearance in England of liberalism, industrial development, more general education and the spread of the ideals of democracy, and influenced also by Continental thought, especially the spirit of the French Revolution. This is the time in which England entered definitely upon that period of modern struggle, change and reorganization which is to be seen still continuing in contemporary affairs. Some of the writers belonging to it are Thomson, Collins, Gray and Cowper, Goldsmith, Chatterton, Blake, Crabbe, Burns, Coleridge, Wordsworth, Keats, Shelley, Scott and Byron. Juniors and seniors; alternates with Course B; 3 hours. Credit, 3.

Assistant Professor Smith.

B. *Prose from 1744 to 1832* (fall of 1915, 1917). — A course in English prose paralleling Course A, which see. Some of the writers belonging to the period are Johnson, Sterne, Goldsmith, Burke, Miss Burney, Coleridge, Landor, Lamb, De Quincey and Hazlitt. The political essayists and the reviews will receive attention, but prose writers whose principal work was done in the novel will not be emphasized (see Course 15). Juniors and seniors; alternates with Course A; 3 hours. [Not given in 1915–16.] Credit, 3.

Assistant Professor Smith.

14. English Writers and Thought. — A. *Nineteenth Century Verse* (spring of 1915, 1917). — In general conception this course is like Course 13, which see. It begins with literature under the economic and social conditions of Victorian England, involving the advance of democracy, the spread of knowledge and culture, the advance of science, and the increase of industrialism, accompanied somewhat by materialism. The literature of the period takes new forms and directions; among its characteristics is an earnest endeavor to interpret ideals to a vastly increased and incompletely prepared reading public ("social service"). Tennyson, Browning, Mrs. Browning, Arnold, the Rossettis and Morris, Swinburne and Clough are among its noteworthy authors. Contemporary verse-writers will receive some notice. Juniors and seniors; alternates with Course B; 3 hours. Credit, 3.

Professor Lewis.

B. *Nineteenth Century Prose* (spring of 1916, 1918). — This course parallels Course A, which see. Among the writers discussed will be Macaulay, Carlyle,

Ruskin, Newman, historians (*e.g.*, Froude) and essayists (*e.g.*, Pater, Arnold and Symonds). Fiction writers are given little attention (see Course 15), but contemporary writers of other prose will be given some notice. Juniors and seniors; alternates with Course A; 3 hours. Credit, 3. Professor LEWIS.

15. PROSE FICTION. — A. *The Novel* (fall of 1914, 1916). — Readings, references, reports and class-room talks. The course is mainly informal. Among the results that may follow the study of the novel are: (*a*) a sense of critical method, springing from the consideration of historical development and of types; (*b*) a deepened humanism, consequent on the study of acts and motives of men and the influences that modify them; (*c*) increased appreciation of artistic method and form; and (*d*) acquaintance with a kind of literature that has grown into great importance through the popularizing of science, the downward extension of learning, and the democratizing of society. Juniors and seniors; alternates with Course B. Credit, 3. Associate Professor NEAL.

B. *The Short Story* (fall of 1915, 1917). — Readings, references, reports and class-room talks. The course is mainly informal. General texts, Neal's "Short Stories in the Making" and "To-day's Short Stories Analyzed." Particular results that may be obtained from short-story study are: (*a*) self-culture, the short story being well adapted to stimulate the literary, dramatic and imaginative faculties; and (*b*) acquaintance with that type in which American literature has especially succeeded. Juniors and seniors; alternates with Course A. Credit, 3. Associate Professor NEAL.

16. THE DRAMA AND SHAKSPERE. — The source, technique and development of drama, accompanied by a study of Shakspere, his mind, manner and technique. The minor Elizabethan dramatists, their influence on Shakspere, and Shakspere's influence on later writers, will be considered, as will the English social and industrial conditions of the time, their causes and their influence on Shakspere and his fellow writers. Extensive reading, analysis and interpretation of his comedies, tragedies and histories, and of modern dramatists is included. Juniors and seniors; every year; 3 hours. Credit, 3. Assistant Professor SMITH.

RURAL JOURNALISM.

[The courses in journalism emphasize rural journalism. They aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant the application of journalistic principles in getting and suitably presenting material adapted to the non-urban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. As practical work, members of the classes supply "The Bay State Ruralist," a feature page for the "Springfield Sunday Union." Members of all classes, except in Courses 1, 2 and 5, are subject to the following requirements: (1) preparation of all copy in typewriting in the news room (laboratory); (2) recopying in corrected form of copy after editing, or rewriting of stories under direction; (3) reading regularly of a daily newspaper and of a weekly periodical; (4) turning in weekly a specified number of suggestions for news stories or other articles.]

Elective Courses.

1. FOUNDATIONS OF WRITING: EXPOSITION. — Advanced composition; planning expository thought; expository structure; analysis of specimens, including contemporary articles from farm and rural life publications, bulletins,

etc.; some bulletin writing, including presentation of technical information for nontechnical readers. Juniors and seniors. Credit, 3.

Assistant Professor PRINCE.

2. FOUNDATIONS OF WRITING: NARRATION AND DESCRIPTION. — The fundamental elements of style, word-choice, diction, sentence form and paragraph types. Description of persons, places, objects, industries and productional processes, the temper and characteristic aspects of public gatherings, moods, behavior and character-sketching. Narration of incident, sustained action, events in series and the like, as in biography, dramatic situation, history and fiction. Juniors and seniors. Credit, 3. Associate Professor NEAL.

3. NEWS-GATHERING AND NEWS-WRITING. — The foundation aims and conceptions of journalism. Readings, lectures, quizzes and personal conferences; reporting on runs and on assignment; regular reading of a daily paper and of a weekly review or farm journal, with reports thereon. The central purpose is to develop ability to pick out essentials from inessentials, perceive elements of interest, and present facts with appeal to the reader. (Further practice is provided in Courses 9 and 10.) Though given somewhat informally, the year's work will bring before the student such subjects as these: City and rural newspapers, class and trade journals, reviews, magazines. Journalistic style. Nature, classes and tests of news. News values. Form of the news story; lead and feature. Stories not primarily news; feature and human-interest stories, etc. News sources; runs, assignments, correspondents. News in the home community; farm reporting; employment of news to develop home interests. This course and Course 4 are recommended to students whose vocation will require the popular presentation of technical or other information; *e.g.*, extension workers, county agents, agricultural school instructors, experiment-station editors, survey and other social service workers, men engaged in sociological or economic investigations, landscape architects, and civil and sanitary engineers. Students desiring practice in the writing of special, magazine and feature articles might find this course adapted to their purpose. Juniors and seniors. Credit, 2.[1]

Associate Professor NEAL.

4. NEWS-GATHERING AND NEWS-WRITING. — As outlined under Course 3, except that students who have taken Course 3 will be assigned different readings and may be given a larger amount of reporting or other writing.

5. DESK EDITING. — A technical course for men professionally interested in journalism. Revision and rewriting; writing from another's notes; copy-reading, proof-reading, headline writing. Laboratory course. Seniors and juniors. Credit, 1. Associate Professor NEAL.

7. EDITORIAL MATERIALS AND METHODS. — Readings, quizzes, reports and personal conferences; regular reading of one daily paper and one weekly review or rural life periodical; writing of editorial articles; current events.[2]

[1] It is proposed to make this a 3-credit course after 1915–16.

[2] The addition of readings to afford an outline of recent modern history is proposed. It would add 1 to the number of credits.

Though given somewhat informally, the year's work will bring before the student such subjects as these: Editing as interpretation and as executive direction; the urban, the agricultural and the rural editor; relation of the editor to his community; editorial organization. The business side of editing. The newspaper as a public utility; its relations to community welfare. Editorial subjects and writing; sources of information; rural topics and their interpretation. Recommended to non-majoring students who desire practice in discovering the significant aspects of matters of public attention and in effectively expressing thought thereon. Laboratory course. Seniors and juniors. Credit, 2. Associate Professor NEAL.

8. EDITORIAL MATERIALS AND METHODS. — As outlined under Course 7.

9, 10. ADVANCED JOURNALISTIC PRACTICE. — Preparation, editing and publication of a rural life page or periodical. Members of the class are expected to make several trips to "The Springfield Union" offices on days when "The Bay State Ruralist" page is making up, and individual students may sometimes be placed in charge of the make-up. Recommended (like Courses 3 and 4) to students interested in writing special, magazine and feature articles. Primarily a senior course. Credit, 3.[1] Associate Professor NEAL.

PUBLIC SPEAKING.

Required Courses.

1, 2. FRESHMAN PUBLIC SPEAKING. — Freshman public speaking is required in either the first or the second semester at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Some attention is given to breath control and development of speaking voice, considerable attention to pronunciation and enunciation, and a large amount of attention to the preparation and delivery of extempore speeches. Text-book, Shurter's "Extempore Speaking," supplemented by lectures and discussions. Freshmen; in semester 1 or 2 as directed; 1 hour. Credit, 1.

Assistant Professor PRINCE and Mr. RAND.

Elective Courses.

7. DEBATING. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the intercollegiate debates. Prerequisite, Course 2. Two hours. Credit, 2. Assistant Professor SMITH.

8. OCCASIONAL ORATORY. — Exercises for voice and gesture; a study of the elements of vocal expression and action; speeches on assigned topics; prescribed reading; the preparation and delivery of a formal oration or two. It is especially recommended for those who desire to enter the Flint contest. Two hours. Credit, 2. Assistant Professor SMITH.

[1] An increase of credits to 4 is proposed for next year.

FRENCH AND SPANISH.

Associate Professor Mackimmie, Mr. Harmount.

French.

Required Courses.

1, 2. Elementary French. — The essentials of grammar are rapidly taught, and will be followed by as much reading as is possible. This course is required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4. Mr. Harmount.

3. Intermediate French (third year). — Training for rapid reading; the reading of a number of short stories, novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.
Associate Professor Mackimmie and Mr. Harmount.

4. Intermediate French. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3.
Associate Professor Mackimmie.

5. Advanced French (fourth year). — A reading course; Balzac's "Eugenie Grandet" and "Le Père Goriot" and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4. Three hours. Credit, 3. Associate Professor Mackimmie and Mr. Harmount.

Elective Courses.

6. Advanced French (fourth year). — A general view of the history of French literature; Kastner and Atkins' "History of French Literature." Several plays of the great classical dramatists will be read. Individual conferences on outside reading selected by the student. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.
Associate Professor Mackimmie.

7, 8. Scientific French. — This course is planned to meet the requirements of the individual student and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read. Three hours. Credit, 3. Mr. Harmount.

9, 10. Modern French Literature. — The outline is intended as a suggestion. The exact subject-matter of the course will be determined when the men are enrolled The object of this course is to give an introduction

to recent movements in French literature. In the drama, readings from Augier, A. Dumas, fils, Delavigne; in the novel, from Flaubert, the de Goncourts, Zola; in criticism, from Taine, Renan, Sainte-Beuve; for the literary history of the period Lanson's "Histoire de la Litterature Française." Prerequisite, the required French. Juniors or seniors; 3 hours. Credit, 3.

Associate Professor MACKIMMIE.

SPANISH.

Elective Courses.

1, 2. ELEMENTARY SPANISH. — Grammar, with special drill in pronunciation; exercises in conversation and composition. Reading from a reader and selected short stories. Intended primarily for juniors; open to other students upon arrangement; both semesters; 3 hours. Credit, 3.

Associate Professor MACKIMMIE.

3, 4. MODERN SPANISH AUTHORS. — Reading from modern Spanish novel and drama. Translation of English into Spanish. Private reading. Prerequisites, Courses 1 and 2. Intended primarily for seniors; 3 hours. Credit, 3.

Associate Professor MACKIMMIE.

GERMAN AND MUSIC.

Associate Professor ASHLEY, Mr. JULIAN.

GERMAN.

Required Courses.

1. ELEMENTARY GERMAN. — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering in German, and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German. Arranged for freshmen; open by permission to other students; 4 hours. Credit, 4. Mr. JULIAN.

2. ELEMENTARY GERMAN. — As stated under Course 1. Prerequisite, Course 1.

3. INTERMEDIATE GERMAN. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Associate Professor ASHLEY.

3A. INTERMEDIATE GERMAN. — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. JULIAN.

4. INTERMEDIATE GERMAN. — As stated under Course 3. Prerequisite, Course 3.

4A. Intermediate German. — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3.

5. Advanced German. — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3.

Associate Professor Ashley.

Elective Courses.

6. Advanced German. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5. Three hours. Credit, 3. Associate Professor Ashley.

7. Scientific German. — Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students. Open to juniors who have completed Course 4A or more advanced work; 3 hours. Credit, 3. Associate Professor Ashley.

8. Scientific German. — As stated under Course 7.

9. Conversation and Composition. — Translating connected English into German. Reproducing outside readings in German orally in class. One hour. Credit, 1. Associate Professor Ashley.

10. Modern German. — As stated under Course 9.

11. German Literature. — Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust," and one modern typical drama. Prerequisite, Course 6 or 10. Three hours. Credit, 3. Associate Professor Ashley.

12. German Literature. — As stated under Course 11.

Music.

Elective Courses.

1. History and Interpretation of Music. — History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Associate Professor Ashley.

2. History and Interpretation of Music. — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1.

Associate Professor Ashley.

DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

AGRICULTURAL ECONOMICS.

Professor Cance, Mr. Read, Mr. Strand.

Required Course.

2. Agricultural Industry and Resources. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Professor Cance, Mr. Read and Mr. Strand.

Elective Courses.

3. Elements of Agricultural Economics. — This course is designed to follow the required work in the elements of economics. It deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; determination of price; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Professor Cance.

5. Historical and Comparative Agriculture. — Recommended to students in journalism or education. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Seniors and juniors; open to other students upon arrangement; prerequisite, Course 3 or equivalent; 3 hours. [Not given in 1915–16.] Credit, 3. Mr. Strand.

6. Co-operation in Agriculture. — The course treats of the history, principles and business relations of agricultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements; (2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, with particular

reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises; 3 hours. Credit, 3.
Professor Cance.

7. The Agricultural Market. — A study of the forces and conditions which determine the prices of farm products, and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market and direct sales are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work. Juniors, seniors and graduate students; 3 hours. Credit, 3. Professor Cance.

8. Problems in Agricultural Economics. — An advanced course for students desirous of studying more intensively some of the economic problems affecting the farmer. Some of these are: land problems — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems — cost of producing farm products, farm labor in New England, immigration, agricultural credit. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Graduate students, seniors and juniors; open to others on approval; 3 hours. Credit, 3. Professor Cance.

9. Seminar. — Research in agricultural economics and history: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1.
Professor Cance.

10. Seminar. — As stated in Course 9.

11. Transportation of Agricultural Products. — This course will sketch the development of the transportation in the United States, covering highways, waterways, railways and electric ways with reference to the facilities for and cost of transporting farm products, opening up new agricultural areas or industries, and contributing to the wealth and welfare of the agricultural population. Lectures, text and field work. Juniors, seniors, graduate students, and others on approval; 3 hours. Credit, 3. Professor Cance.

AGRICULTURAL EDUCATION.

Professor Hart.

Elective Courses.

1. Rural School Problems. — Primarily for teachers. A study of agricultural education; the theory and practice of teaching; rural school organization; methods of instruction; the place and function of agriculture in the course of study for both rural and city schools; planning and practical work in school and home gardens; planning of equipment and ornamentation of rural school grounds. One lecture period, and 2 2-hour laboratory periods. Credit, 3. Professor Hart.

2. As stated under Course 1.

3. Meaning of Education (Psychology). — For teachers and others desiring an introduction to mental science. A study of the development, structure and functions of the nervous system and the sense organs; the development and nature of mental activities; the nature of the learning processes. Three lecture periods. Credit, 3. Professor Hart.

4. History and Philosophy of Education. — For teachers and others desiring an introduction to educational theories. A study of educational ideals and movements as exemplified by leading nations and races; the growth of educational institutions as influenced by science and industry; the history and meaning of industrial and agricultural education. Three lecture periods. Credit, 3. Professor Hart.

5. Problems in Rural Education. — For teachers or others interested in special phases of education, such as child development, physical and mental; school organization; rural schools; secondary schools; school programs; grading and promotion of pupils; school grounds and school architecture and equipment; normal schools and the preparation of teachers; agricultural teaching and agricultural schools. Two lecture periods. Credit, 2. Professor Hart.

6. As stated under Course 5.

7. Graduate Courses. — See Graduate School.

9. Extension and County Agent Work. — The course consists chiefly of library research work. Each student will be required to produce one or more complete lectures under guidance both as to method of preparation and subject-matter, and one or more demonstrations. These lectures will be presented to public audiences in the presence of a board of critics. Some instruction will be given in organization and administration of the Extension Service. The Extension Service will be responsible for the public presentation and criticism. The student's major adviser will be responsible for the accuracy of the subject-matter. The Department of Agricultural Education will be responsible for the preparation of the lectures. One lecture and two laboratory periods. Credit, 3. Professor Hart.

10. As stated in Course 9.

RURAL SOCIOLOGY.

Professor Phelan, President Butterfield, Professor Hart, Miss Goessmann, Mr. Lund, Mr. Baird.

Elective Courses.

1. Elements of Rural Sociology. — A broad survey of the field of rural sociology, including such topics as the origin of rural sociology, its methods and problems; relation of sociological to the scientific and technical aspects of agricultural problems; the development of the rural community in New England and the west, religious, educational and social ideals of rural people; characteristics and influence of the rural environment, the movement of the rural population, the effects of immigration; rural institutions, the school, the church, local government, effects of modern conditions of life on rural in-

stitutions; rural organization; problems of progress, an analysis of the needs of rural life in its further development. To be required of sophomores after 1915–16. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3. Professor Phelan.

2. Rural Organization. — A study of the organized agencies by which rural communities carry on their various forms of associated life, particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment; principles underlying leadership, qualifications of the paid leader and the lay leader; the field of rural social service, national, State and local, preparation and opportunity for service; rural community building, a study of organized ways and means by which aid is given local communities. Three hours. Credit, 3.
President Butterfield.

3. The Literature of Rural Life. — A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities. Three hours. Credit, 3. Miss Goessmann.

4. Rural and Business Law. — The work of this course will cover such points as land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures and class discussions; 3 hours. Credit, 3. Professor Hart.

5. Rural Government. — A general survey of the development of rural government in the United States; origin of the New England town, its influence upon the west, advantages, development of efficiency, county government, the influence of the farmer in legislation, good roads movement, credit, facilities, taxation, boards of agriculture, agricultural colleges and experiment stations in relation to rural welfare; national government; a general survey of political organizations and movements among farmers in the United States and foreign countries and their influence in shaping legislation; relation of the Department of Agriculture, postal system, the various national commissions and agencies to rural welfare. Lectures, readings, written exercises on assigned topics; 3 hours. Credit, 3. Professor Phelan.

6. Field Work in Rural Sociology. — This course is designed to meet the needs of students who wish to do some constructive work in rural social service while still in college. The work will be carried on in co-operation with the various college agencies engaged in rural service. Any project for which credit in this course is to be asked must first have the approval of the head of the department. Prerequisites, Courses 1 and 2. Credit, 1 to 3 hours, according to project.

7. The Social Psychology of Rural Life. — Characteristics of the rural mind; character of hereditary and environmental influences; nature and effects of face-to-face groups; psychological effects of isolation, relative secur-

ity and freedom from strain; relation of contact with nature, of control over immediate environment, of family co-operation and of neighborhood life to self-control, self-expression, sympathy, service and leadership; nature and effects of fashion, conventionality and custom; character of discussion and public opinion, and their relation to class feeling and organization; relation of individualism, conservatism and homogeneity to crowd phenomena and progressive democracy. Three hours. Credit, 3. Professor PHELAN.

8. RURAL SOCIAL SURVEYS. — A careful study of the theory and function of statistics, the limitations and difficulties in the use of statistics, the interpretation of statistical data, various methods of graphic representation; a study of surveys, kinds and use, method of gaining information, the basis for conclusions, value of information gained. Text and lectures; 3 hours. Credit, 3. Professor PHELAN.

10. FARMERS' ORGANIZATIONS. — The history, purposes and achievements of the Grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; the method, scope and history of local, State and national associations formed about some farm product, their influence in forming class consciousness and in shaping agrarian legislation; need of federation. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3. Professor PHELAN.

11. SEMINAR.

12. SEMINAR.

GENERAL DEPARTMENTS.

MILITARY SCIENCE AND TACTICS.

First Lieutenant H. W. Fleet, 19th Infantry, U. S. A.; Assistant: Ordnance Sergeant J. J. Lee, U. S. A., retired; Adjutant Assistant: Quartermaster Sergeant Alex. Smart, U. S. A., retired.

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-year course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical (drill) courses in military science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in physical education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offenses of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

The required uniform is of olive drab cloth, costing about $17. It is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $17 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

Required Courses.

1. Freshman Drill. — Practical instruction in infantry drill regulations through the battalion. Ceremonies. First semester until Christmas recess; 3 hours. Credit, 1. Lieutenant Fleet.

2. Freshman Drill. — As stated under Course 1. Company training in bayonet exercises and physical exercises with and without arms; 3 hours. Credit, 1. Lieutenant Fleet.

3. Freshman Tactics. — Theoretical instruction in infantry drill regulations through the battalion and ceremonies. Lectures on military subjects and military history; 1 hour. Credit, 1. Lieutenant Fleet.

4. Freshman Tactics. — As stated under Course 3.

5. Sophomore Drill. — Practical instruction in field service regulations in the service of security and information. Corporals are appointed from this class. First semester until Christmas recess; 3 hours. Credit, 1.
Lieutenant Fleet.

6. Sophomore Drill. — As stated under Course 5; intrenching, combat.

7. Sophomore Tactics. — Theoretical instruction in map problems in security and information. Combat. Lectures on military subjects and military history; 1 hour. Credit, 1. Lieutenant Fleet.

8. Sophomore Tactics. — As stated under Course 7.

9. Junior Drill. — Practical instruction in the small arms firing regulations in target practice, estimating distances and field firing. Lieutenants and sergeants are appointed from this class. First semester until Christmas recess; 3 hours. Credit, 1. Lieutenant Fleet.

10. Junior Drill. — As stated under Course 9.

Elective Courses.

11. Senior Drill. — Conduct drills of lower classes. Field officers and captains are appointed from this class. These officers are paid. The positions in every case are obtained by competition. It is to be understood that cadets obtaining these positions will be reported to the Adjutant-General of the army as distinguished cadets. First semester until Christmas recess; 3 hours. Credit, 1. Lieutenant Fleet.

12. Senior Drill. — As stated under Course 11.

PHYSICAL EDUCATION AND HYGIENE.

Associate Professor Hicks, Mr. Gore, Mr. Fitzmaurice.

Hygiene.

Required Course.

1. Hygiene. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1.
Associate Professor Hicks.

Physical Education.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in military science. All classified undergraduate students are given a physical examination upon entering.]

Required Courses.

1. Elementary Gymnastics. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit (given only for Course 2), 1. Mr. Gore and Mr. Fitzmaurice.

2. Elementary Gymnastics. — As stated under Course 1.

3. Graded Gymnastics. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit (given only for Course 4), 1. Mr. Gore and Mr. Fitzmaurice.

4. Graded Gymnastics. — As stated under Course 3.

5. Gymnastics. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit (given only for Course 6), 1. Mr. Gore and Mr. Fitzmaurice.

6. Gymnastics. — As stated under Course 5.

Elective Courses.

7. Training Course. — History of physical education; supervision of indoor and outdoor athletic contests and games; athletic administration. Seniors; 3 hours. Credit, 1. Associate Professor Hicks.

8. Training Course. — As stated under Course 7.

THE GRADUATE SCHOOL.

The Graduate School.

Kenyon L. Butterfield, A.M., LL.D., President of the College.

Charles H. Fernald, Ph.D., Honorary Director of the Graduate School.

Charles E. Marshall, Ph.D., Director of the Graduate School and Professor of Microbiology.

Graduate Staff, 1915–16: Associate Professor Anderson, Professor Cance, Professor Chamberlain, Professor Fernald, Professor Foord, Associate Professor Gordon, Professor Graham, Professor Hart, Professor Haskell, Professor Lindsey, Mr. Morse, Associate Professor Osmun, Associate Professor Peters, Professor Phelan, Assistant Professor Quaife, Professor Sears, Dr. Shaw, Professor Waugh, Director Marshall, President Butterfield; Mr. Watts, Secretary.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years; the degrees of master of agriculture and doctor of agriculture are now granted to meet strictly professional needs. The number of requests for each of these courses is apparently increasing. In recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station specialists in farm management, dairying, live-stock husbandry, poultry science, agronomy, landscape gardening, pomology, vegetable gardening and floriculture; for positions as bacteriologists, botanists, chemists, entomologists; and for numerous other positions requiring a great amount of scientific knowledge, training and experience.

Organization.

The school is based upon the department as the unit, and the apprenticeship system as the most effective means of instruction. This gives to the student individuality in treatment and an intimacy with actual conditions of work and operations. Besides, each student is assigned to an advisory committee, composed of the instructor in charge of his major subject as chairman, and instructors in charge of his minor subjects as members, which directs his graduate studies. The chairmen of all these committees together constitute the graduate staff, which controls the policy of the graduate school.

Admission.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work

in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Nature, Methods and Requirements of Graduate Work.

Graduate work differs from undergraduate work in its purposes and methods. The primary aims of the instructor are emphasized in an attempt to have the student adjust himself and place himself in his environment; develop the rule of self-direction and self-instruction; acquire the power of accurate reasoning; gain proficiency and skill in his selected field of study or practice; and obtain an appreciative and discriminative insight into experimentation and original research. Methods are not devised, therefore, for attractiveness, entertainment and superficial reviews, but for the creation of initiative and profound thought, thorough acquaintance with detail, independent advance and industrious habits. Careful reading, lectures, conferences, surveys, laboratory exercises and field work are some of the agencies utilized.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as a major and the other as a minor. These subjects may not be selected in the same department. An original thesis is considered a part of the major subject.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major and the others as minors. No two of these subjects may be taken in the same department. An original thesis shall be considered a part of the major subject.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary properly to equip the individual professionally.

Candidates for the degree of doctor of agriculture are required to select a major and such other subjects as will develop the major in its greatest intensity and comprehensiveness. Successful experience is also requisite, together with a thesis which represents a masterly survey or intimate study through accurate application of some phase of the major subject.

Candidates for membership in the graduate school who do not desire to work for a degree may, with the approval of the director of the school, take more than one subject in the same department, or pursue work in several departments, if their preparation will permit. A statement of the subjects chosen must in each case be submitted to the director of the graduate school for approval by the student's advisory committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised and credit granted as are essential to the highest standards of efficiency.

Theses.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject; must show that its writer possesses the ability to carry on original research; and must be an actual contribution to knowledge.

Two copies of each thesis in its final form, ready for the printer, must be submitted to the director of the school before the candidate for the degree may take the required oral examination. One of the said copies, to contain all drawings, is to be retained as an official copy by the said director, and the other by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis. When printed, three copies of each thesis must be deposited with the director of the graduate school and three copies with the department in which the work was carried out.

Final Examinations.

For the degree of master of science or master of agriculture, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degrees of doctor of philosophy or doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

Degrees conferred.

The degree of master of science and master of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half[1] to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours[1] each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary. The thesis may be waived for the degree of master of agriculture.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

[1] All time statements refer to minimum time.

2. The devotion of twenty hours[1] each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science or master of agriculture is $10, and for the degree of doctor of philosophy or doctor of agriculture, $25.

Courses offered.

Courses available as major subjects for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.
Microbiology.

Courses available as major subjects for the degree of master of science: —

Agriculture.
Agricultural economics.
Agricultural education.
Agronomy.
Animal husbandry.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.

Courses available as major subjects for the degree of master of agriculture: —

Agronomy. Animal husbandry. Poultry science.

Courses available as minor subjects for the degree of doctor of philosophy: —

Agriculture.
Agricultural economics.
Agricultural education.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Microbiology.
Poultry science.
Rural sociology.
Zoölogy.

Courses available as minor subjects for the degree of master of science: —

Agriculture.
Agricultural economics.
Agricultural education.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Microbiology.
Mathematics and physics.
Poultry science.
Rural sociology.
Veterinary science.
Zoölogy.

[1] All time statements refer to minimum time.

General Outline of Courses for Advanced Degrees.

Agricultural Economics (Major Course). — 1. Graduate research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances the method includes facility in investigation, tabulation and interpretation of results.

2. Candidates for the master's degree, or candidates offering a minor in agricultural economics, will be required to pass an examination covering the undergraduate work now offered in agricultural economics, including Course 3, the elements of economics, Course 7, the agricultural market and Course 6, co-operation in agriculture; and in addition such definite research work as may be outlined by the department, to consist of original investigations in some particular divisions of the subject of agricultural economics. Courses 6, 7 and 8 are for graduates and undergraduates. Special investigations may be made by electing seminars in agricultural economics.

3. Candidates for the master's degree will be required to write a thesis or a report covering results of a specific line of personal investigation in one or more fields of the subject. Each candidate will also be required to have a working knowledge of the general field of economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, statistics of agriculture and prices, and markets and marketing.

Agricultural Education (Major Course). — Courses are available in agricultural education as major or minor subjects for the degree of master of science, or, as a minor subject, for the degree of doctor of philosophy. Study will be pursued along one or several of the following lines: —

1. Massachusetts school legislation.
2. Origin and growth of primary, secondary and higher education in Massachusetts.
3. The origin and growth of normal schools, industrial schools and agricultural schools.
4. Educational literature, fiction, periodicals and reports.
5. The physical and mental development of the individual.
6. School administration.

Agronomy (Master of Science). — This course is developed in two directions, depending on whether the candidate is preparing for scientific work or for teaching. In the former case more attention is paid to methods of investigation; in the latter, to interpretation of results. The student may specialize in either Part I. or Part II. of the following: —

I. *Soil Fertility.* — (*a*) The humus problem: Effect of different cropping systems on the humous content of the soil; cultivation, drainage and liming in their effect on soil humus; increase by green manure crops; use of animal manures as sources of humus; conservation of organic matter.

(*b*) The nitrogen question: Losses of nitrogen as occasioned by cropping system, tillage methods and soil treatment; gain of nitrogen through legumes and other agencies; commercial nitrogen, physiological effect upon the plant, comparison of different forms both in regard to their ultimate as well as immediate effect, amount of application from the business standpoint.

(*c*) Mineral elements of plant food: as above for nitrogen.

(*d*) Lime: Causes of "soil acidity;" comparison of forms of lime; ultimate effect of lime on soil fertility; cost *versus* returns from use of lime.

(*e*) Crop adaptability.

II. *Field Crops.* — (*a*) Distribution, as governed by soil fertility; climatic influences; economic conditions.

(*b*) Kinds and varieties.

(*c*) Cultural methods.

(*d*) Breeding: A knowledge of the principles of breeding is presupposed. With this as a basis, a study of methods, practices and results, as applied to a given crop, must be made.

III. *Thesis.* — The thesis may be taken either in soil fertility or in crop production. In either case a problem for original investigation must be formulated by the candidate, the line of attack developed, the work carried through and results presented in acceptable form.

Literature. — It is required that the candidate familiarize himself with the available literature of the various topics studied.

Animal Husbandry (Master of Science). — *Course A. Animal Breeding.* — 1. Reading: Thorough survey of the scientific works dealing with plant and animal breeding and improvement.

2. Project: Each student must outline and pursue some Mendelian problem.

3. Thesis: This to be a complete treatise of the problem which the student undertakes; it should be a valuable contribution to the present knowledge of the question of animal breeding.

Course B. Animal Nutrition. — This course is in outline similar to A. It is designed to cover the field of nutrition, feeding and management of live stock.

Seminar: Regular periods will be devoted to a discussion of the projects undertaken, together with criticisms of the available material on the question pursued.

Object. — To give the student a comprehensive knowledge of feeding, breeding and management of live stock. This may be divided into a major and a minor, in order to give the student the opportunity of devoting a proportionate share of his time to the class of live stock in which he is particularly interested.

Reading. — The student is to make a very complete survey of experimental and periodical literature dealing with the various phases of the subject.

Practice. — Before the completion of the work for the degree, the student must have the equivalent of at least one year's continuous work on an approved live-stock farm.

Seminar. — Regular periods to discuss progress of the work.

Animal Pathology (Minor Course only). — 1. Reviews in anatomy.

2. Reviews in organography and histology.

3. Special lectures and readings in general and special pathology.

4. Laboratory studies in general and special pathology.

5. Pathological technique.

6. Conferences.

Botany (Major Course). — Advanced work in botany may be taken in the following branches: —

(*a*) Plant physiology and ecology.

(*b*) Mycology.

(*c*) Plant pathology.

(*d*) Histology.
(*e*) Cytology.
(*f*) History of botany.

Particular attention is given to plant physiology and plant pathology, and students usually select for research a problem bearing on some phase of these branches of botany. It is aimed, however, to give each student a broad training in the science, and the attention which each one is required to give to other branches is determined by his previous training. Extensive reading of botanical literature is required. Lectures are given and weekly seminars are held at which important current botanical papers are reviewed and discussed.

Chemistry. — I. Major course for the degree of master of science. Students will be required to take Courses 21, 28, 29, 30 and 31. In addition to this the requirements in the various thesis subjects are: —

Organic and Bio-Chemistry. — Courses 32 and either 25, 26 or 27, and 4 hours for one semester selected from Courses 23 (*b*) and (*f*), and 24.

Analytical and Agricultural Industrial Chemistry. — Courses 33, 23 (4 hours), and 4 hours for one semester selected from Courses 22, 24, 25, 26 and 27.

Physical Chemistry. — Courses 34, 24 and 4 hours for one semester selected from Courses 22, 23, 25, 26 and 27.

The candidate must pass a final written and oral examination before the Department of Chemistry upon undergraduate Courses 1 to 11, inclusive, 13 and 15, and upon all graduate work taken in chemistry by him.

II. Major course for the degree of doctor of philosophy. Students will be required to take Courses 21 to 31, and one course selected from 32, 33, 34 or 35. In addition, the student may be required to spend at least one semester at some other recognized institution pursuing graduate work in chemistry. The candidate must pass a final written examination before the Department of Chemistry, and an oral examination before the graduate staff, upon the whole field of chemistry, and must be especially well prepared in the lines of work covered by his research.

III. Minor course for the degrees of master of science and doctor of philosophy. Students will be required to take work totaling 36 to 48 hours. This may be selected from any of the undergraduate Courses 5, 6, 9 to 15, inclusive, or any of the graduate courses for which the student is prepared. In addition, the candidate must pass a final written and oral examination before the Department of Chemistry upon the courses taken and upon undergraduate Courses 5, 6, 9, 10 and 15.

The following is a list of the courses: —

21. *Inorganic Preparations.* — Laboratory. The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Ten to fifteen of the preparations given in Biltz's "Laboratory Methods of Inorganic Preparations" will be made by each student. First semester, 4 hours. Associate Professor Anderson.

22. *Advanced Inorganic Preparations.* — Laboratory. Continuation of Course 21. Either semester, 4 hours. Associate Professor Anderson.

23. *Advanced Analytical Chemistry.* — Laboratory. This course may be taken in part as follows: (*a*) electrolytic analysis, 4 hours per week; (*b*)

ultimate analysis, 4 hours per week; (*c*) special analytical work to meet the needs of the individual student, 4 hours per week. In addition, parts of undergraduate Courses 10 and 11 may be taken as follows: (*d*) fertilizers, 4 hours per week; (*e*) insecticides, 4 hours per week; (*f*) milk and butter, 4 hours per week. Either semester. Credit determined by amount of work done.

Professor WELLINGTON and Associate Professor PETERS.

24. *Advanced Physical Chemistry.* — Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; per cent. hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; critical temperature of carbon dioxide or sulphur dioxide; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; adsorption of iodine by charcoal; splitting of racemic glycerinic or racemic tartaric acids into their optical components. To each student separate work will be assigned. Either semester, 4 hours.

Associate Professor ANDERSON.

25. *Advanced Organic Preparations.* — Laboratory. The preparation of compounds not included in Courses 5 and 6, such as the Kolbe synthesis of salicylic acid; benzophenone and Beckmann's rearrangement; rosaniline, malachite green, congo red, indigo and other dyes; synthesis of fructose; Grignard reaction. Barnett, Cain and Thorpe, Gatterman, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Either semester, 4 hours. Professor CHAMBERLAIN.

26. *Advanced Bio-Chemistry.* — Laboratory. The hydrolysis of proteins and isolation of the amino acids; the study of milk, blood and urine; dietary and digestion studies. References: Abderhalden, Plimmer, Salkowski, Hawk, etc. To each student separate work will be assigned. Either semester, 4 hours.

Professor CHAMBERLAIN.

27. *Industrial Organic Chemistry.* — Laboratory. The preparation, on a large scale, of wood alcohol, acetic acid, ethyl alcohol, benzene and cellulose products, such as mercerized cotton and artificial silk. References: Molinari, Rodgers and Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Either semester, 4 hours.

Professor CHAMBERLAIN.

28. *Advanced Theoretical and Analytical Chemistry.* — Lectures. The following are among the topics considered: compressibility of the atoms; atomic structure; valence electrons; and detailed studies of substances important in analytical chemistry, such as barium sulfate, silver chloride, magnesium pyrophosphate. Second semester, 1 hour. Associate Professor PETERS.

29. *Advanced Organic and Bio-Chemistry.* — Lectures. Selections from the following topics: the constitution, chemical relationship, physiological function and industrial uses of fats, cholesterol, phytosterol, lecithin, carbohydrates, proteins, amino acids, urea, uric acid, purine bases, alkaloids, terpenes, tannin,

essential oils, synthetic dyes, rubber; the study of enzymes, fermentation, animal food and nutrition, photosynthesis; isomerism, tautomerism, condensation. References: Monographs on Bio-Chemistry, Chemical Monographs, Abderhalden, Plimmer, Haas and Hill, Lewkowitsch, Cohen, Fischer, Euler, Czapek, Cain and Thorpe. First semester, 1 hour.

Professor Chamberlain.

30. *Advanced Theoretical and Physical Chemistry.* — Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hindrance; stereoisomerism of other elements than carbon; molecular association; similarity between compounds of silicon and carbon; radioactivity. Second semester, 1 hour. Associate Professor Anderson.

31. *Seminar.* — Conferences, reports or lectures. Both semesters, twice a month, 1 hour. Professor Lindsey.

32. *Research in Organic and Bio-Chemistry.* — Both semesters. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor Chamberlain.

33. *Research in Analytical or Agricultural Industrial Chemistry.* — Both semesters. A minimum of 20 hours' laboratory work per week. Credit determined by the amount of work done.

Professor Wellington and Associate Professor Peters.

34. *Research in Physical Chemistry.* — Both semesters. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

Associate Professor Anderson.

35. *Research in Agricultural Chemistry.* — Both semesters. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor Lindsey and Experiment Station Associates.

Entomology (Major Course). — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology and polyembryony; transformations; histology; phylogeny; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogamy; chemistry of colors; coloration; luminosity; deformities; variation.

(*b*) *Ecology.* — Dimorphism; polymorphism; protective devices; mimicry; psychoses; insect architecture; plant fertilization; insect products; geographical distribution; methods of distribution; migration; geological history; insects and disease; enemies of insects, vegetable and animal; duration of life; experimental entomology.

(*c*) *Economic Entomology.* — Special methods of control; insecticides; special research; insect photography; methods of preparing illustrations;

field work and life-history investigations; insect legislation; methods of record keeping.

(*d*) *Systematic Entomology.* — History of entomology; classifications and the principles of classification; nomenclature and its rules; how to find and use literature; preparing indices; number of insects known and in existence; lives of prominent entomologists; methods of collecting, preparing, preserving and shipping; important collections; location of types.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on topics named above and on the different orders of insects, in English, French or German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

Horticulture. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now constitute the college Division of Horticulture, as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Prof. F. A. Waugh, head of the Division of Horticulture.

Landscape Gardening (Major Course). — Every student before receiving his master's degree with a major in landscape gardening must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. *Theory.* — The principles of esthetics as applied to landscape gardening.

2. *Design.* — The principles of pure design and their application in landscape and garden planning.

3. *Construction.* — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.

4. *Maintenance.* — Methods, organization, cost.

5. *Practice.* — Office work, drafting, estimating, reporting, charges, accounting.

Qualifications. — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

Thesis or Project. — Each student, before receiving the master's degree with a major in landscape gardening, must present a satisfactory thesis or complete project. A thesis will consist of a careful original study of some problem in landscape gardening, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of: —

(*a*) Original surveys, including topography.
(*b*) Block plans, showing original design.
(*c*) A rendered plan or plans of the main features.
(*d*) Detailed working drawings.
(*e*) Estimates of cost.
(*f*) Complete report and letter of transmittal.

Minor Course. — Any student electing a minor in landscape gardening will be directed to take such courses from the regular catalogue list as may seem most suitable for him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

Microbiology (Major Course). — 1. *Reading.* — Readings will be assigned and reports with critical analyses of literature covering the general subject will be required. For this purpose such material will be selected as will be most pertinent to the needs of the student. Lectures will be given from time to time.

2. *Seminar.* — At intervals the immediate laboratory work and studies of the student will be surveyed and the literature bearing thereon will be discussed. The shaping of investigations in accordance with the critical analyses of the specific literature of the problem involved will be the important rôle of the seminar.

3. *Morphological and Cultural Studies.* — Special advanced studies in the cytology, morphology and cultural characters of micro-organisms will be the general theme of this course. The important factors in classifying and grouping organisms call for an intimate knowledge of this particular phase of microbiology. Laboratory technic will receive emphasis.

4. *Physiological Studies.* — The changes produced by micro-organisms and their functionings in general open a very broad field for investigation and systematic study. It is advised that every graduate student in microbiology give much attention to this branch, gaining thereby the greatest comprehensive knowledge of physiological processes, as well as the methods employed in their determinations.

5. Special advanced courses will be offered in those phases of microbiology indicated by the undergraduate courses: —

1. Fermentation microbiology.
2. Soil microbiology.
3. Dairy microbiology.
4. Food microbiology.
5. Hygienic and sanitary microbiology.

It will be assumed that all graduate students of microbiology must be acquainted with the details of all important phases of agricultural microbiology.

Minor Course. — 1. Courses constituting undergraduate major in microbiology, or their equivalent, will be required.

Note. — If the student is familiar with the work of these courses, advanced work will be given in accordance with the graduate major outline.

2. Emphasis will be placed upon that particular phase of microbiology which will be particularly pertinent to the student's major course.

3. Readings will be assigned, and will be reviewed in conferences.

4. Special lectures on selected subjects in microbiology will be given from time to time.

Poultry Science (Major Course for the Degrees of M.S. and M.Agr.). — 1. *Reading.* — This course consists of a review of the entire field of poultry literature, covering books, bulletins and special articles. A written report on one or more subjects will be required.

2. *Seminar.* — This course consists of a criticism of the most important experiments carried on at the various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc., besides a detailed study of some of the largest poultry projects in this country.

3. *Anatomy (Gross and Histological), Physiology, Embryology and Surgery.* — This course consists of a careful study of the anatomy and physiology of the fowl; also the development of the chick in the shell, not only as an embryological study, but in relation to morphogenesis and heredity. Instruction in surgical technique, adapted to fowls, forms part of the work.

4. *Breeding.* — The student will carry on such breeding experiments as time and facilities permit. He may also do work in connection with our regular experimental projects. A detailed study of the pertinent literature will be required. Animal Husbandry 5, or its equivalent, is a prerequisite.

5. *Feeding.* — A study of the relation of various foods and other substances to the morphology and physiology of the bird, with special reference to such subjects as egg production, feather form and structure, condition of flesh, bone, etc.

6. *Brooding.* — Studies will be made upon the relation between viability and rate of growth and the following topics: type of brooder, number of chicks in brood, ventilation, humidity, sanitation, exercise and weather conditions; also a comparison of hen-hatched chicks with those hatched artificially.

7. *Incubation.* — This course includes a study of a large number of perplexing problems of a practical, scientific and mechanical nature.

8. *Poultry Diseases.* — This course includes a study of a number of the most important poultry diseases in relation to the rapidity with which they spread and their eradication; also various problems in poultry sanitation.

9. *Thesis.* — This may be either of a scientific or practical nature, or both, and subjects may be chosen from any one of the above courses, except the first and second. (Required of students working for degree of M.S.)

Note 1. The postgraduate course presupposes all undergraduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 4, 5 and 6. At the discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

Note 2. Practical poultry work may be required, but no credit will be given for such work.

Note 3. Courses 1 and 2 are designed particularly for minors.

Rural Sociology. — *General Sociology.* — Candidates for the doctorate must have a good working knowledge of general sociology.

1. History and development of sociological thought.
2. The literature of sociology.
3. Problems of modern sociology and methods of reform.

Rural Sociology. — Candidates will be required to pass an examination in all courses offered by this department primarily for undergraduates, as shown in the departmental classification.

Research Work in Rural Sociology. — Each candidate will be required to select two or more of the divisions of the subject for intensive study and research.

1. The rural community: —
 (*a*) Historical development.
 (*b*) Influence of modern conditions on family and community life.
 (*c*) Problems and methods in community organization.
 (*d*) Community planning in Massachusetts.
2. Origin and development of rural institutions: —
 (*a*) Scope, function and influence of educational institutions on rural social progress. Plans for betterment.
 (*b*) History of the development of the rural church, its problems and program for improvement.
 (*c*) The farm family, in its relation to religious, cultural, educational and social agencies. The relation of the standard of living to rural social progress.
3. Rural organization: —
 (*a*) The scope and function of rural organization in development of rural life.
 (*b*) Work of the national government in rural organization.
 (*c*) County and institutional work in rural organization.
 (*d*) Leadership in its relation to organization.
4. Rural government and rural law: —
 (*a*) Development of rural local government in New England and the west. Progress in efficient local self-government.
 (*b*) Relation of the State to the farmer, influence of the farmer in legislation, the organized ways and means by which the State aids the farmer directly.
 (*c*) Work of the national government in its relation to the social welfare of the farming people.
 (*d*) Agrarian legislation in the United States and Europe affecting rural social welfare.
5. Farmers' organizations: —
 (*a*) Social problems underlying farmers' organizations in reference to service and permanency.
 (*b*) Principles of organization.
 (*c*) History of farmers' organizations in the United States.
6. Rural social and sociological surveys: —
 (*a*) An intensive study of the place and function of statistical data in the sociological field, its evaluation and interpretation.
 (*b*) A critical study of social surveys of rural life and methods of survey, with a view to discovering the strength and weakness of each.
7. Social condition of the rural people: —
 (*a*) Origin and development of rural ideals.
 (*b*) The status of the rural people in relation to health, morality, crime, etc.
 (*c*) Problems of social psychology arising in rural life.

A thesis showing the results of personal investigation on some particular topic or topics must be presented. The thesis must show familiarity with the material bearing on the subject, ability in discovering and utilizing original sources, judgment in evaluating facts, evidences and authorities, originality and independence of thought. It must be a contribution in a very definite way to rural sociological thought.

Candidates for the master's degree, or candidates offering a minor in rural sociology, will be required to pass an examination in the following courses offered by the department for undergraduates: —

Course 2. Rural organization.
Course 5. Rural government.
Course 7. Social psychology of rural life.

In addition, they will be required to pursue a line of investigation through work in the seminar.

Veterinary Science. — Work is available in anatomy, hygiene, veterinary pathology, medicine, surgery, parasitology and other special lines or divisions of the subject.

Zoölogy. — Courses in zoölogy may be available as a minor for the degree of master of science and as a minor for the degree of doctor of philosophy. The nature of the work will necessarily vary according to circumstances, and may be intensive in a special field, like that of embryology or economic ornithology, and be correlated closely with the major work of the student, or it may be of a more general character, depending on the student's needs or previous acquaintance with general zoölogical science. The time devoted to zoölogy as a minor for either of the above-named degrees may vary from 12 to 16 hours per week, pursued for a year and a half.

List of Students.

A list of the degrees conferred in the Graduate School, and of the students enrolled, is given in the general lists at the end of the volume.

THE SHORT COURSES

AND

THE EXTENSION SERVICE.

The Short Courses and the Extension Service.

SHORT COURSES.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those who cannot come to the college for the regular academic courses. They furnish the student with instruction in modern accepted methods, and are made as concentrated and as practical as possible. In the main, the instruction is given by the regular teaching force of the college, the same laboratories and equipment being used as in the regular college work.

The short courses may be grouped as follows: —

A. Winter Schools.
 1. Ten Weeks' Course.
 2. Farmers' Week.
 3. Annual Beekeepers' Convention.
 4. Polish Farmers' Day.
 5. Spring Beekeeping School.
 6. Apple Packing School.
 7. Annual Conference of County Agents and Vocational Agricultural Instructors.

B. Summer Schools.
 1. Summer School of Agriculture and Country Life.
 2. School for Rural Social Service.
 3. School for Library Workers.
 4. Poultry Convention.
 5. Agricultural Camps.
 6. Conference on Rural Organization.

C. Miscellaneous Short Courses.
 1. Short Courses for Special Groups (feed dealers, town officials, etc.).
 2. Special Days for Foreigners.
 3. Meetings of Organizations at the College.

Expenses of the Short Courses. — The expense of attending any of the short courses is approximately as follows: —

Registration fee (Ten Weeks' Course, Apple Packing School, Summer School),	$5
Furnished rooms in private houses (per week),	$1.50–$3
Board at college dining hall (per week),	$4–$4.25
Board with private families (per week),	$5–$6

A lunch counter is operated in connection with the college dining hall. Meals may be obtained there *à la carte* at very reasonable rates.

Students in each of the dairy courses must provide themselves with two white wash suits and caps for use in the practical dairy work. The cost in Amherst is about $1.25 for suit and cap.

Requirements for Admission to Short Courses. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic. Practical experience in farm, garden, orchard or greenhouse work is an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character. References are required, and these are investigated before applicants are accepted.

A. Winter Schools, 1916.

1. Outline of the Ten Weeks' Courses (January 3 to March 10, inclusive). — The following courses are offered: —

1. Soil Fertility. Professor Haskell. Three lectures a week.
2. Field Crops. Assistant Professor Jones. Two lectures and one two-hour laboratory period a week.
3. Types and Breeds of Live Stock. Professor McNutt. Three lectures and two two-hour judging periods a week.
4. Live Stock Feeding. Assistant Professor Quaife. Three lectures a week.
5. Animal Breeding. Professor McNutt. One lecture and one two-hour laboratory period a week.
6. Dairying. Professors Lockwood and Jamison, Mr. Coons and Mr. Baldinger. Five lectures and one one-hour, two two-hour and two three-hour laboratory periods a week.
7. Dairy Bacteriology. Professor Marshall. Two lectures a week.
8. Animal Diseases and Stable Sanitation. Professor Paige. Two lectures a week.
9. Poultry Husbandry. Professor Graham and Mr. Payne. Five lectures and one two-hour laboratory period a week.
10. Farm Management and Farm Accounts. Professor Foord. One lecture and one two-hour laboratory period a week.
11. Fruit Growing. Professor Sears. Three lectures and one two-hour laboratory period a week.
12. Market Gardening. Assistant Professor A. S. Thomson. Three lectures and two two-hour laboratory periods a week.
13. Landscape Gardening. Assistant Professor Harrison. Two two-hour periods a week.
14. Floriculture. Associate Professor Nehrling and Mr. Thurston. Three lectures a week; field trips on Saturday.
15. Forestry. Professor Clark. One lecture a week.
16. Botany. Assistant Professor Anderson. Two lectures a week.
17. Entomology. Dr. W. S. Regan. Three lectures a week.
18. Beekeeping. Associate Professor Gates and Mr. Byard. Two lectures and one two-hour laboratory period a week.
19. Farm Mechanics. Professor Gunness. One lecture and one two-hour laboratory period a week.
20. Rural Sanitary Science. Professor Marshall. Two lectures a week.
21. Rural Improvement. Professor Waugh. Two lectures a week.
22. Problems of Marketing and Distribution. Professor Cance. Two lectures a week.

2. Farmers' Week. — In order to reach those who cannot come to the college for a longer time this very practical course, five days in length, is given each year. The regular college equipment is used, and work of the regular faculty is supplemented by lectures and demonstrations by eminent men and women.

The 1916 program will probably be divided into seven sections, as follows: —

1. Field Crops and Farm Management.
2. Animal Husbandry and Dairying.
3. Poultry Husbandry.
4. Fruit Growing, Market Gardening, Floriculture, Forestry.
5. Women's Section, Home Economics.
6. Business Organization and Marketing.
7. Beekeeping.

These sections take up the time from early morning until late afternoon. Prominent men are engaged for the evening lectures. Fruit, corn, live stock,

dairy and poultry shows, and other exhibits, are among the leading features. No fee is charged.

Owing to the prevalence of foot and mouth disease in 1915 the best program yet prepared was necessarily abandoned. Special efforts will be made in the preparation for the biggest Farmers' Week yet held, from March 13 to 17, inclusive, 1916.

3. Annual Beekeepers' Convention. — This convention of beekeepers is held during Farmers' Week. Illustrated lectures, practical demonstrations and commercial displays are features of the convention. Meetings of State and county beekeepers' associations and of apiary inspectors also are scheduled at this time.

4. Polish Farmers' Day. — A special day is each year set aside which is known as "Polish Farmers' Day." Instruction is given relative to the crops and animals in which the Polish people are most interested, soil fertility problems, co-operation, American citizenship, history, etc. Hundreds of Polish farmers reside in the Connecticut valley, and large numbers avail themselves of this opportunity which is peculiarly their own. It will be held on March 23, 1916.

5. Spring Beekeeping School. — This school is held in Amherst once in three years, being conducted in other sections of the State in intervening years. It is an intensive course for a limited number of beekeepers. It occupies seven hours daily for a period of two weeks. Courses are given in practical beekeeping; life of the honeybee; special problems of the beekeeper; crops foraged by bees; relation of bees to pollination of plants; bees in horticultural practice. The instructors are Professors Gates, Fernald, Paige, Brooks, Osmun, and Chenoweth and Mr. Byard. The course will be given May 31 to June 14, 1916.

6. Apple Packing School. — The work of this school, which is conducted by the Department of Pomology, is of a practical nature, and includes both box and barrel packing. Persons taking the course will become familiar with the various types of packs, and will receive sufficient practice to enable them to do good commercial packing. The 1916 school will probably be held November 15 to 21, inclusive.

7. Annual Conference of County Agents and Vocational Agricultural Instructors. — In December of each year a one-week conference of county agents and vocational agricultural instructors is held at the college. This is for the purpose of correlating the extension work throughout the State, and to enable the field workers to keep in up-to-the-minute touch with agricultural problems, methods and research as conducted in Massachusetts as well as other States in this particular section of the country. The fourth annual conference will probably be held during the second full week in December, 1916.

B. Summer Schools.

1. The Summer School of Agriculture and Country Life. — The Summer School of the Massachusetts Agricultural College will open June 26, 1916, for a term of four weeks. The work of the summer school was designed originally for teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture, and who can come to the

college conveniently during the summer season. Practical courses are offered for the benefit of such persons.

The formal instruction in the summer school is given in definite courses. Each student may elect not less than 10 nor more than 15 exercises a week, unless a larger or smaller amount of work is allowed by the supervisor. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

General field exercises are arranged for one afternoon of each week. These are on topics of interest to all. Excursions are arranged for every Wednesday afternoon, and more extended excursions for the whole school are planned for every Saturday. These excursions are in charge of an instructor. In the past they have proved a very enjoyable feature of the work. Round-table and special discussions are arranged by the various instructors as their courses require.

A course of evening lectures on popular topics relating to the work of the school is a feature of the general program. This lecture course is free to all students.

Early registration is desirable. Registration fee for the summer school is $5, payable at the time application is made. No other tuition is charged. This fee should accompany application blank and should be made payable to the Massachusetts Agricultural College.

2. The School for Rural Social Service. — The Massachusetts Agricultural College offers a School for Rural Social Service in connection with the usual Summer School of Agriculture and Country Life. The courses offered give instruction, furnish information and direct the attention of those interested more particularly to the rural field, which has as yet received little systematic study when compared with that which has been given to urban conditions.

The courses offered are intended for clergymen, teachers, librarians, town officers, grange workers and others who devote a considerable portion of their time to problems of community development. Other courses given in the summer school during this period are also open to those who register. There is a registration fee of $1 for those attending this school. The dates for 1916 are July 11 to 25.

3. School for Library Workers. — During the summer of 1915 a very successful School for Library Workers, of one week's duration, was held at the college. The work was planned especially for those librarians and library assistants in village and rural libraries whose special training and experience had necessarily been limited. This school will again be offered in 1916 from July 17 to 22.

4. Poultry Convention. — In order to give a large number of poultrymen, who cannot come to the college for a long period of time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, and in marketing poultry products, an annual three-day convention is offered. This will be held from July 19 to 21, 1916, inclusive.

5. Agricultural Camps. — During the month of July three camps are arranged in order that boys from rural districts and small towns may receive some instruction in agriculture and clean, wholesome sports, and that they may have impressed upon them their responsibilities as coming members of society. The daily program consists of camp duty, flag raising, agricultural lessons, talks on hygiene and good citizenship, play and recreation, instruction in

handicrafts, photography, evening camp fires and lectures by men prominent in boys' work. A small fee is charged to help defray the cost of board and incidental expenses. As a third prize in the State-wide boys' and girls' clubs a week in camp at the college is offered. The third boys' camp is given over to these prize winners, usually 35 to 40 in number. A separate camp, upon a slightly different plan and under different supervision, is held for the girl prize winners of the previous year.

6. Conference on Rural Organization. — This conference is held as a closing feature of the summer school each year. It takes up various problems of New England country life. Numerous State organizations co-operate with the college in providing the programs. Section meetings of various groups are held each forenoon, a general round-table discussion is held each afternoon, and lectures are delivered each evening by persons prominent in social and educational work. Many small group conferences are also arranged.

The holding of this conference in 1916 is now under advisement, and it may be omitted owing to the fact that the Graduate School of Agriculture is to be held at the Massachusetts Agricultural College in 1916. If held, the dates of the conference will probably be July 25 to 28, inclusive.

The faculty of the 1915 summer schools was as follows: —

Kenyon L. Butterfield, LL.D., President of the College and Head of the Division of Rural Social Science.
William D. Hurd, M.Agr., Director of the Extension Service and Supervisor of Short Courses.
Warren S. Baker, B.Sc., Instructor in Agronomy.
John L. Byard, Superintendent of Apiary.
Ada M. Chandler, B.A., Library Cataloguer.
Walter W. Chenoweth, Associate Professor of Pomology.
William D. Clark, A.B., M.F., Professor of Forestry.
Laura Comstock, Extension Professor of Home Economics.
Samuel Coons, Instructor in Dairying.
Philip H. Elwood,[1] Jr., B.Sc.Agr., Extension Instructor in Civic Improvement.
Rev. Wm. F. English, Ph.D., Pastor, East Windsor, Conn.
R. Hay Ferguson,[2] B.Sc.Agr., Extension Professor of Agricultural Economics.
Henry T. Fernald, Ph.D., Professor of Entomology and Chairman of the Division of Science.
James A. Foord, M.Sc.Agr., Professor of Farm Administration and Head of the Division of Agriculture.
Burton N. Gates, Ph.D., Associate Professor of Beekeeping.
Harold M. Gore, B.Sc., Assistant in Physical Education.
John C. Graham, B.Sc., Professor of Poultry Husbandry.
Charles R. Green, B.Agr., Librarian of the College.
F. Josephine Hall, A.M., Adviser for Women.
Ida E. Hall, LL.B., Plays and Pageants.
Harriet J. Hopkins,[1] B.Sc., Extension Instructor in Home Economics.
William P. B. Lockwood, M.Sc., Professor of Dairying.
A. H. MacLennan, Lecturer in Horticulture, MacDonald College, Quebec.
Charles J. Maynard, Naturalist and Lecturer on Bird Life.
Frederick A. McLaughlin, B.Sc., Instructor in Botany.
Ezra L. Morgan, A.M., Extension Professor of Community Planning.
Orion A. Morton, Extension Professor of Agricultural Education.
Ethel H. Nash, Extension Instructor in Agricultural Education.
Arno H. Nehrling, Associate Professor of Floriculture.
A. Vincent Osmun, M.Sc., Associate Professor of Botany.
Samuel R. Parsons, B.Sc., Instructor, Pennsylvania State College.
Charles A. Peters, Ph.D., Associate Professor of Inorganic and Soil Chemistry.
Elvin L. Quaife, B.Sc.Agr., Assistant Professor of Animal Husbandry.
Frederick W. Ried, Director of Practical Arts, Framingham (Mass.) Normal School.

[1] Resigned. [2] Deceased.

Henry K. Rowe, Ph.D., Newton (Mass.) Theological Seminary.
Walter Ruetschi, Assistant Director of Athletics, New Jersey Public Schools.
Fred C. Sears, M.Sc., Professor of Pomology.
Frank A. Waugh, M.Sc., Professor of Landscape Gardening and Head of Division of Horticulture.

A bulletin describing the summer schools is issued in March each year, and may be had upon application to the Supervisor of Short Courses.

C. Graduate School of Agriculture.

A Graduate School of Agriculture to be held at the college from July 3 to 28, 1916. Every possible effort will be made to correlate the work of the various summer schools with the work of the graduate school, in order that students in each may benefit to the largest possible degree by the opportunities presented by the other.

D. Miscellaneous Short Courses.

1. Short Courses for Special Groups. — Plans are now under way to provide short courses at Amherst, lasting four or five days, for fertilizer agents, feed agents and dealers, milk inspectors, seed dealers and other groups desiring such instruction. Information concerning these may be obtained by writing the Supervisor of Short Courses.

2. Special Days for Foreigners. — Each year there are provided at the college special days for foreigners. Instruction is given in soil management, co-operation, American citizenship and history. This work for foreigners will be arranged at the college, or in different sections of the State.

3. Meetings of Organizations at the College. — It is customary for the various State organizations of fruit growers, poultrymen, breeders and others to meet for conventions and picnics at the college. Such gatherings are welcomed by the college authorities, and organizations are cordially invited to meet in Amherst. The Extension Service will assist in arranging programs and other forms of instruction and entertainment.

All requests for announcements or further information regarding any of the short courses should be addressed to the Supervisor of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

THE EXTENSION SERVICE.

What is known as the Extension Service is an organized effort on the part of the college to carry systematic and dignified instruction to the thousands of people throughout the State who are unable, owing to various reasons, to take advantage of the regular courses offered at the college. It is in reality the "carrying of the college to the people of the State." Every department of the institution, in so far as the regular teaching and research work will permit, contributes what it can to this work. The work may be roughly classified under the following general heads: general administration; correspondence study; itinerant instruction which includes lectures and lecture courses, exhibits, demonstrations and extension schools; extension work through the various departments of the college, in which the extension specialist is responsible to the head of the department for the technique of the work and to the director of the extension service for the accomplishment of the work; co-operative

work of various kinds with the United States Department of Agriculture; and extension work through county, district and local agents. Some of the ways in which this is being done are described briefly below.

Correspondence Courses. — The purpose of the correspondence courses is to furnish systematic instruction in those lines which will most benefit the general farmer, the dairyman, the fruit grower, the market gardener, the poultryman, the teacher, the homemaker, and all others who are interested in agricultural and country-life matters. It is the purpose to present up-to-date, accurate and concise information in such a manner and in such language that all who pursue the study may readily understand the work.

Courses offered. — A number of courses are in process of revision and several are being rewritten. During 1916 courses will be available as follows: —

1. Soils and Soil Fertility. Professor Haskell.
2. Manures, Fertilizers and Soil Amendments. Professor Haskell.
3. Field Crops. Assistant Professor Jones.
4. Farm Dairying. Professor Lockwood.
5. Fruit Growing. Professor Sears, Associate Professor Chenoweth and Mr. Rees.
6. Market Gardening. Assistant Professor A. S. Thomson.
7. Animal Feeding. Mr. Turner.
9. Farm Accounts. Professor Foord.
10. Entomology. Dr. Regan.
12. Beekeeping. Associate Professor Gates.
13. Forestry. Professor Clark.
14. Shade Tree Management. Associate Professor Osmun.
17. Poultry Husbandry. Professor Graham.
18. Home Economics. Extension Professor Comstock.
19. Rural Sociology. Professor Phelan and Mr. Baird.

Methods of conducting the Work. — The best known methods of conducting correspondence course teaching are employed. Certain courses are based entirely upon text-books, others consist wholly of typewritten lectures, while still others combine the two. Even when books are not required they are usually recommended for reference or collateral reading.

The courses are designed primarily for the individual student. A new phase of the work, however, is the organization of study clubs or classes, meeting together periodically and using the courses as a basis of study. Correspondence in regard to this work is invited.

Enrollment of Correspondence Courses. — Students may enroll in the courses at any time between October 1 and June 1, and one year from the date of registration is allowed for the completion of each course. It has been found advisable to discontinue the courses through the summer months, as farmers and most other students cannot devote the necessary amount of time to the lessons during this season.

Expenses of the Correspondence Courses. — In order that none shall enroll except those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at $1 for each course except where the courses are divided, and it has been found advisable to charge $1 for each of the parts in these instances. The fee is payable strictly in advance, at the time the enrollment card is sent. When text-books are required the student purchases these.

Lectures and Demonstrations. — The members of the faculty of the college are, when other duties will permit, available for lectures and demonstrations before granges, men's clubs, women's clubs, Y. M. C. A.'s, farmers' clubs,

boards of trade and other organizations. A list of more than 40 lecturers and 200 subjects on various phases of agriculture, country life, economics, sociology, education, civic betterment and various scientific subjects has been prepared. Full courses of lectures or single lectures may be arranged.

Organizations arranging the lectures are asked to pay the traveling expenses of the lecturer, provided no admission fee is charged. When admission is charged the lecturer is entitled to a fee in addition to traveling expenses.

Extension Schools. — The extension schools are of two distinct types, the first being the Agricultural Extension School, dealing with the production side of farming and with the problems of the farm home; the second is the Extension School in Community Planning, having to do with the organization and selling end of agriculture, and with instruction in the planning and carrying forward of various community activities.

It is also possible to arrange special extension schools along one particular line of work, such as fruit growing, dairying, etc.

Communities desiring an extension school make a written request, agreeing to defray all local expenses, such as the rent, heating and lighting of a suitable hall, and the board of the instructors during the school.

Agricultural Extension Schools. — The college sends a corps of instructors to a town for a five-day school of instruction. At present the following courses are offered: soil fertility, animal husbandry and dairying, fruit growing, poultry husbandry and vegetable gardening for the men, and a homemakers' course for the women. Morning and afternoon sessions only are held.

Community Planning Extension Schools. — These schools are arranged to extend over at least three days. The following courses are offered: education, agricultural organization, community program, civic improvement, farm management, town administration, public health, community recreation and homemaking. Morning, afternoon and evening sessions are held in these schools.

Educational Exhibits at Fairs and Other Shows. — The college cooperates with the managers of fairs, industrial expositions, corn shows, poultry shows, fruit shows and other exhibitions by making educational exhibits.

For outside work a large tent has been provided. In this about thirty cabinets containing educational material are arranged. A corps of lecturers and demonstrators accompany the exhibit and give practical instruction daily.

For inside work a space at least 40 by 60 feet is required for this exhibit. Smaller exhibits along special lines are sent to corn, fruit and poultry shows, milk shows, child welfare exhibits, and so forth.

The managers of fairs and exhibits are required to partially meet the cost of presenting these exhibits.

Extension Work in Special Fields.

Extension Work in Fruit Growing. — This work includes lectures and demonstrations on laying out and planting orchards, pruning, spraying, thinning, grading, packing and marketing fruits. Demonstration orchards, new and renovation plots, are established in different sections of the State, under a coöperative agreement between the college and the owners of land. Extension schools in fruit growing and fruit grading and packing are arranged on request. Visits to farms for advisory work are made, and correspondence on orcharding subjects are invited.

Extension Work in Animal Husbandry. — This work includes lectures, demonstrations and advisory assistance on subjects pertaining to cattle, horses, sheep and swine, as well as instruction in barn planning. Assistance in organizing dairy improvement associations and breeders' associations is given; stock-judging contests for boys are arranged at the leading fairs.

Extension Work in Dairying. — This includes lectures and demonstrations on the handling and care of milk, cream, butter and cheese; Babcock testing, dairy utensils and dairying manufactures. Educational campaigns may be arranged in different communities, seeking to educate producers, dealers and consumers as to the production and distribution of clean, safe milk.

Extension Work in Poultry Husbandry. — In addition to conferences at the college and visits to the plants of poultrymen, advice on general poultry management, diseases, mating and laying out and planning buildings, this work includes co-operative work with other State and county agricultural and educational organizations, exhibits of poultry appliances at fairs and shows and other incidental phases.

Extension Work in Farm Management, Field Studies and Demonstrations. — This is carried on coöperatively between the college and the office of farm management of the United States Department of Agriculture at Washington. It consists of a study of farm conditions and farm management problems; instruction in keeping farm accounts and growing field crops; the use of fertilizer and lime; advice as to farm equipment, buildings, and so forth.

Extension Work in Civic Improvement. — This is carried on in connection with the Department of Landscape Gardening at the college. Assistance is rendered in various rural and village improvement enterprises, such as the planting and care of shade and street trees, the planning of playgrounds, school grounds, cemeteries, picnic grounds, the beautifying of waterfronts, the rearrangement and development of town commons and reservations of historic interest, and similar activities. Efforts are made to coöperate with local granges, men's and women's clubs, village improvement societies and like organizations.

Extension Work in Agricultural Education. — This is an organized effort to promote in the public schools of the State the study of agriculture and practical arts relating to country life. This is accomplished by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children, and lectures before granges, farmers' clubs and other interested organizations. The work of the agricultural clubs is under the direction of the superintendent of schools or some one recommended by him. Each town should hold an annual exhibit of products. Exhibits representing rather extensive districts are incorporated with the various agricultural fairs in the State. In this manner elementary instruction in agriculture is promoted by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College, which in turn coöperates with the State Board and the National Department of Agriculture.

Extension Work in Home Economics. — The Extension Service, through its home economics workers, stands ready to assist in solving problems relative to the household in the same manner as it is endeavoring through other workers to aid in working out problems of the farm. The work, among other things, includes lectures and demonstrations, assistance in forming girls' clubs and

home economics clubs for women, and coöperation with existing organizations in the matter of interesting young people in the proper care of the home.

Extension Work in Community Planning. — A number of communities in the State have appealed to the college for aid in bringing the various organizations in the community to a higher state of efficiency, in order that they themselves might take definite steps toward community development and advancement. The college is now prepared to make scientific studies of communities which lead up, by means of surveys, to the organization of local committees to study the agricultural, educational, religious, transportation, recreation and civic needs of the communities. Several State organizations and some national organizations are usually brought in to aid in working out the plans presented by these committees. Conferences on community affairs are held upon request. The college acts merely in an advisory capacity, the communities themselves doing the actual organization work.

Library Extension Work. — This consists principally of loaning to public libraries of the State general collections of 10 to 30 books and bulletins on agriculture and related subjects. Special collections of smaller size on specified subjects, such as fruit growing, dairying, poultry, beekeeping, home economics, and so forth, are also sent out. These may be kept from four to eight weeks, according to the demand for them. The only expense to local libraries is transportation charge on the books both ways. The college library also supplies, upon request, information regarding books on agriculture and related subjects.

Agricultural Surveys. — To acquire definite information as to existing conditions in rural communities, to be used as a basis for further extension work, agricultural surveys are made. The different organizations and officials in the community, such as the town officers, superintendent of schools and teachers, clergymen, librarians and others, usually co-operate in making such surveys. The survey covers all phases of community life, including soil survey, farm management practices, and the educational, social, religious and recreational life. The inventory is made upon carefully prepared blanks.

Business Co-operation and Marketing. — This work has for its object the establishment of agriculture on a better business basis. Assistance is given in organization of co-operative buying and selling associations, the securing of rural credit, the adoption of better methods of marketing, the establishment of a better market for agricultural produce, and other lines of agricultural co-operation.

Massachusetts Agricultural College Agricultural Improvement Association. — This is an organization of ex-students of the college who are now farming in the State, and who have banded themselves together for the purpose of promoting the agricultural development of the State by carrying on experiments and demonstrations for the betterment of rural pursuits, by using and encouraging the use of better seeds and animals, by the organization of co-operative societies, and by the dissemination of literature bearing on recent agricultural investigations. Production of high-grade strains of corn and potatoes for the Massachusetts seed trade and work for the improvement of animals are some of their activities.

Demonstration Farms and Plots. — Believing that one of the most effective ways of teaching modern farm practice is by the establishment of demonstrations (not experiments) in all sections of the State, thus showing a man on his own land and under his own conditions the result of proper farm practices, the college is placing demonstration plots throughout the State, showing the

proper fertilization for grass and other crops, the results of rotations, the proper care of orchards and dairy management. For several years the Faunce Demonstration Farm has been under the advisory direction of the college, as is also the Paige farm at Hardwick. The Faunce farm has proved to the Cape Cod region that small fruit, poultry and vegetables can be successfully grown there. Demonstration farms are usually managed by a committee or board of trustees representing the farm and a committee appointed from the college acting jointly.

County or District Agricultural Agents. — As rapidly as State, government and local funds are available, men trained in agriculture are being assigned to counties and districts of the State to act as agricultural agents. Residents of the county or district may, without cost, call upon the agent for assistance upon any agricultural subject. The work is being supported through the co-operation of the United States Department of Agriculture, the college and the community engaging the agent.

Advisory Work with Institutions and Individuals. — Special effort is made to comply with as many of the requests of State institutions and individuals who ask for advice on farm problems as possible. The force of instructors available for this work is at present insufficient to take care of all the demands. Special trips, including visits to a number of the various State institutions, are occasionally made by a group of specialists.

Publications of the Extension Service. — In addition to the regular circulars and bulletins which announce the various short courses and lines of work mentioned, a monthly pamphlet, "Facts for Farmers," giving timely information on agricultural subjects, is issued. Large numbers of helpful circulars and bulletins are annually distributed. A series of bulletins especially for the farm woman is one feature of this work. Reports of the work of the Extension Service, dairy record blanks, farm account blanks, boys' and girls' club circulars, lists of books, and so forth, may be had upon request.

Co-operation with Other Organizations. — The aim of the Extension Service is to co-operate with existing organizations so far as possible. It is, therefore, glad to work with local organizations, and welcomes suggestions from town officers, local granges, farmers' clubs, women's clubs, Y. M. C. A.'s, Y. W. C. A.'s, boards of trade, village improvement societies, teachers, clergymen, librarians and others interested in agriculture and country life, as to needs and methods best adapted to the meeting of these needs.

Information by Correspondence. — Besides the activities mentioned, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry, which always receive the most careful attention from every department of the institution.

Pamphlets and bulletins are sent free to all who apply for them, and any who desire such help as has been mentioned should address the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

General Information.

General Information.

A. FINANCIAL AND ADMINISTRATIVE.

STUDENT EXPENSES.

Tuition.[1] — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $40 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.

All students entering the college for the first time as undergraduates or unclassified students are charged a matriculation fee of $5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

Dormitories and Board. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present the price of board there is about $4 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

EXPENSES.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts free; other citizens of the United States, $40 a year; foreigners, $120 a year.

	Low.	High.
Matriculation fee, first year,	$5 00	$5 00
Room in college dormitories or in private houses,	39 00	110 00
Board in college dining hall, $4 a week,	144 00	144 00
Laundry, 50 cents to 85 cents a week,	18 00	30 00
Military uniform, first year,	16 40	16 40
Laboratory fees,	2 00	20 00
Books, stationery and miscellaneous items,	15 60	24 60
	$240 00	$350 00

[1] This statement applies to those registering as regular or unclassified students.

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $275 and $375 per year.

Initial Charges.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee,	$5 00	–	–
Board (if at college dining hall) four weeks in advance,	16 00	$16 00	$16 00
Assessment for support of Social Union,	1 00	1 00	1 00
Laboratory fees: —			
Chemistry,	5 00	–	–
Zoölogy,	–	2 00	–
For elective subjects,	–	–	1 00–10 00
Military uniform,[1]	16 40	–	–
Room rent (if in college dormitory),	–	–	19 50–33 00
Student tax for support of athletics,[2]	8 00	8 00	8 00
Student tax for support of nonathletic activities,[2]	2 50	2 50	2 50

[1] This cost is subject to modification from year to year.

[2] While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

Laboratory Fees.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present, the fees charged are as follows: —

	Per Semester.
Agronomy: —	
Course 3,	$1 50
Course 4,	50
Courses 5 and 6,	1 00
Animal husbandry: —	
Courses 2 and 4,	1 00
Course 7,	2 00
Botany: —	
Courses 2, 3, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16,	3 00
Course 4,	2 00
Course 5,	1 00
Chemistry: —	
Courses 1, 2, 7, 8, 13, 15,	3 00
Courses 3, 4, 5, 6,	4 00
Courses 9, 10, 11, 12, 14, 16,	5 00
Dairying: —	
Courses 1, 2, 3,	1 00
Entomology: —	
Courses 3, 4,	3 00
Landscape gardening: —	
Landscape gardening 1, 2,	2 50
Landscape gardening 3, 4, 7, 8,	3 00
Landscape gardening 6,	1 00
Drawing 1, 2,	2 50
Mathematics: —	
Courses 6, 10,	1 00
Microbiology: —	
All courses, each,	5 00
Pomology: —	
Courses 3, 4,	2 50
Poultry Husbandry: —	
Course 3,	1 50
Course 4,	2 00
Zoölogy: —	
Course 1,	2 00
Courses 3, 4,	4 00

STUDENT AID.

Self Help. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should under-

take work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and sixty or more students are employed at the dining hall. Application for student labor should be made directly to the President. Applicants are required to present statements from parent or guardian and from a selectman or alderman of the town or city in which they reside, showing that the applicant needs assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

Special Notice to Needy Students. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

STUDENT ACCOUNTS.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each semester. This rule is strictly adhered to, and no student will be allowed to register in his class until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the semester he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

STUDENT RELATIONS.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the president for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

INFIRMARY.

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students: —

Management of the Infirmary.

Supervision.

1. The infirmary is under the *general supervision* of Dr. Charles E. Marshall, who is designated as Supervisor of the Infirmary. Miss Florence Levensaler, the resident nurse, is in *immediate* charge of the infirmary.

Use of Infirmary.

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as Professor Hicks gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at the suggestion of Professor Hicks. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health.

3. Students are urged to consult Professor Hicks or Miss Levensaler immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the in-

cipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee.

4. The infirmary fee will be at the rate of $1 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. No charge will be made for miscellaneous treatment of a minor character unless the patient receives one or more meals or remains at the infirmary for one or more nights.

Additional Expenses.

5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient: —

(*a*) *Nurses.* — In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(*b*) *Professional Service.* — If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(*c*) *Supplies.* — Special medical supplies prescribed by a physician or nurse will be charged to the patient. No charge will be made for ordinary medical supplies kept in stock at the infirmary and furnished students in minor cases of illness or accident.

(*d*) *Laundry.* — Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

B. COLLEGE ACTIVITIES.

GENERAL EXERCISES.

Chapel exercises are held two mornings each week. On Wednesday an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

STUDENT ACTIVITIES.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about six years ago. All students become members of the union by paying a small fee. The union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study; in the basement of this building there is also a game room for pool and billiards. In the fall and winter months the union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association is active both socially and religiously. Under its direction voluntary Bible classes are conducted during the winter months. A Catholic club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A dramatic club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and tennis.

A rifle club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Massachusetts Collegian," published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture and horticulture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Scientific clubs also exist in the Departments of French, Entomology, Landscape Gardening and Zoölogy.

There has recently been organized a Collegiate Country Life Club, the membership of which is composed of faculty and students who are particularly interested in the study of country life problems.

A nonathletics student activities board, composed of alumni, faculty and students, has charge of the finances, schedules, etc., of the musical clubs, dramatic club and student publications.

C. ACADEMIC AND DEPARTMENTAL.

DEGREES.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

PRIZES.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1914 were: —

Agriculture. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

Animal Husbandry. — The F. Lothrup Ames prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

Botany. — The Hills prizes, given by Henry F. Hills of Amherst, amount to $35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, $20; for the second best herbarium, $15. No collection deemed unworthy of a prize will be considered.

Entomology. — In 1914 a special prize of $5 was offered to that member of the junior class presenting the best collection of insects.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character and example.

Public Speaking. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

EQUIPMENT.

Agricultural Education. — The courses in this department are planned primarily for those who are preparing to teach. The work is carried on by means of lectures, library and demonstrations. The department has an office, lecture room and a laboratory in the Veterinary Science building. The laboratory is equipped with a balance, dishes, jars, reagent bottles, test tubes, petri dishes, lenses, a Babcock test, a Wisconsin sediment test, Bunsen burner, hot and cold water, electricity, gas and other appliances for giving demonstration and practice lessons in Secondary Agriculture. There is also equipment for conducting children's gardens on the campus. Instruction in school gardens constitutes a part of the practice work of those training for the occupation of teaching. Some practice work in teaching is done in the

grammar grades of the Amherst schools, and in the agricultural departments of Hopkins' Academy, and Smith's Agricultural School at Northampton. This department is also intimately related to the matter of recommending candidates for teachers' certificates. At least four courses in the department are required of students preparing for such certificate. The office is supplied with school and college reports, also a large number of pamphlets and bulletins relating to the subject of agriculture in the schools, courses of study, etc. See note relative to teachers' certificates, under major in Agricultural Education.

Agronomy. — The work in agronomy is carried on by means of lecture, laboratory and field work. The soil laboratories are located in the basement of Stockbridge Hall, and include an elementary laboratory with locker equipment for 200 men, and desk space for four divisions of 50 men each, and an advanced soil laboratory for the work of upper classes, with locker space for 80 men. This laboratory is also equipped with balance room, centrifuge room, steam ovens and moisture cabinets. There is also a workroom attached, equipped with power for grinding soils, fodders and the like.

The crop laboratories are located on the second floor of Stockbridge Hall, the room for seed study being at the south end and allowing for sections of 50 men each. The laboratory for cereal and forage crop work is at the north end of the building, and has locker equipment for 64 men. This laboratory is equipped with large steam ovens, constant temperature electric ovens, Brown-Duval moisture apparatus and ovens for seed germination. Attached is a balance room and also a storeroom; while on the fourth floor of Stockbridge Hall is a room equipped for the storage of seed corn, grains and grasses.

Animal Husbandry. — An accurate and definite knowledge of the market types and grades, and of the various breeds of live stock, is fundamental to the work in this department. The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180, and which is fully adapted to the requirements. There are upwards of 125 head of dairy cattle of various ages available for class-room work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Yorkshire pigs are maintained. The college possesses pure-bred Percherons and French coach horses, besides many work teams of different types, which are available for class-room purposes. A set of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different foodstuffs available for the use of the New England farmer, are included in the equipment for this work. An excellent set of upward of 250 lantern slides, portraying the leading prize-winning, producing and breeding animals of the leading breeds, — horses, cattle, sheep and swine, — belongs to this department, and is regularly used in instructional work. This equipment is being added to from time to time as funds are available.

Botany. — The Department of Botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment-station laboratories devoted to botanical

research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 18,000 sheets of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 20,000 specimens of fungi. The laboratory is equipped with 94 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

Chemistry. — The college Department of Chemistry occupies the entire building previously known as the "old chapel." The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to organic, physiological and physical chemistry, and qualitative analysis. The second floor is occupied by the general lecture room, by offices for the several members of the staff and by laboratories for analytical chemistry. The third floor has been fitted for work in general chemistry, and has desk room and hoods sufficient to accommodate 66 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 100 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

Dairying. — The dairy work is given in Flint Laboratory, a new building designed for the dairy department. It contains large, well-lighted, sanitary and well-equipped laboratories. The equipment is new and of the best types of market milk and farm dairy machines.

Dining Hall. — Draper Hall, a brick colonial building equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college. The building contains a limited number of rooms for young women students.

Drawing. — The class in drawing occupies a room on the second floor of Wilder Hall. It is equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and

architectural details and garden ornaments, two universal drafting machines, an eidograph, centrplineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

Entomology. — *General Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped, and it will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room chemical desks and apparatus provide opportunities for the determination of the impurities and adulterations of insecticides. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

Entomology. — *Beekeeping.* — For this work the main office, museum and lecture rooms are in the entomological building. There is also an apiary covering approximately two acres which will consist of about fifty colonies of bees in various types of hives and maintained for the several practical and experimental purposes. The apiary also includes a collection of nectar-yielding plants representative of the native flora as well as of the more important nectar sources from other localities. Especial opportunity is therefore given for a study of this fundamental problem of forage. Upon the apiary site is an eight-room building (the first in the world erected exclusively for teaching beekeeping) modeled to meet both the requirements of teaching and of a practical apiary. This building contains a boiler room, capacious wintering cellar, wax extraction room, general carpenter and work shop, laboratory, office, honey extraction room and stock room. The beekeeping equipment also includes an unexcelled collection of apicultural implements, natural history specimens and other curiosities. Practically every device used in American apiculture is available, it being the aim of the department to procure new inventions and implements as fast as they appear for the purpose of study and comparison. Available to the students is a private library of apicultural

literature consisting of upwards of 900 volumes and papers, possibly the most complete collection in the country. This entire equipment is acknowledged unique in model and in completeness for the United States and for the world.

Farm Administration. — The college farm of 250 acres is under the general supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

Floriculture. — The Department of Floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a Department of Floriculture better equipped than this. There has been erected a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The Department of Forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distances of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects.

Geology. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes. The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic

microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

Heating, Lighting and Power. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop and well-equipped carpenter shop.

Landscape Gardening. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

Library. — The library — stack room, reading room and office — occupies the entire lower floor of the Chapel-library building. It contains nearly 50,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular and short-course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.30 a.m. to 9.30 p.m. every week day, and from 9 a.m. to 2 p.m. on Sundays, in term time. Shorter hours prevail during vacation.

Market Gardening. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and laboratory particularly equipped for market gardening. A good library of works on vegetable gardening is available.

Mathematics and Civil Engineering. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Military Science. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

Physical Education. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The main floor is used for basket ball, indoor baseball and hand ball. The gallery has been fitted up as a special exercise and gymnastic room, and is equipped with modern developing apparatus, including parallel bars, horses, bucks, chest weights, dumb-bells, Indian clubs and striking bags. An outdoor board track enables students to secure track practice through the winter, and two ice hockey rinks give ample opportunity for hockey practice. Credit is given to all students taking part in outdoor activities. "Treks" are held twice a week, and whenever possible snowshoe and skiing hikes are also held. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a shower-room. The gymnasium classes are held the last two hours in the morning and the last two hours in the afternoon, but students may use the gymnasium at other times for exercise purposes by arrangement with the department. The regulation costume for class exercise consists of a white track suit and white rubber-sole shoes.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Pomology. — The Department of Pomology has 45 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks,

showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There are also two commercial vineyards, and a smaller one in which are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples, plums, pears and peaches, in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1912–13, for instance, apples for class use were received from Idaho, Missouri, Utah, Washington, Maine, Connecticut, Pennsylvania, Montana, Minnesota, Nebraska, Kentucky, Iowa, Wisconsin, Michigan, New York, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrus fruit from Florida and Texas. From the college fruit plantations the following fruits were available: grapes, fifty varieties, representing three native American species and several hybrids; twenty varieties of peaches, twenty varieties of pears, twenty-five varieties of plums, eighty varieties of apples.

Poultry Husbandry. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar, 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, cramming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; a combination laying, testing and breeding house, 18 by 72, for experimental purposes, and a model laying house, 18 by 30, for 100 hens; the 6 old experiment-station buildings, each 12 by 18 feet, to be used as breeding houses; 14 colony houses; 8 growing crops; a manure shed, 14 by 18 feet; and an oil house, 10 by 12 feet. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chickens, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

Public Speaking. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests offer a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollegiate contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

Rural Engineering. — This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings.

The work on farm machinery and farm motors is given in the Rural Engineering building. This is a one-story structure 34 by 68 feet. The equipment includes gasoline engines and pumps and a complete line of farm field machines. A small dynamo and switchboard are used in the study of farm lighting systems. The study of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The work on the small field machines is given in the basement of Stockbridge Hall.

Work on steam engines and steam heating is given in Flint Laboratory.

Rural Journalism. — The news-room, or laboratory, for the courses in rural journalism, is equipped with typewriting machines, copy tables, representative newspapers, reviews, agricultural papers, and trade journals concerning journalism and writing, selected books on journalism, reference books, and a considerable "morgue" of indexed pamphlets and monographs on farming, rural life and rural industry (loan collection). The news-room is in the recently completed Stockbridge Hall, with the division library of the Division of Agriculture, and is kept open until 10 P.M.

Veterinary Science. — The Department of Veterinary Science occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the Departments of Entomology and Zoölogy-Geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 3 floor cases with space for 9 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 6 P.M. The curator is Associate Professor Gordon.

LIST OF AWARDS AND PRIZES, 1915.

Grinnell Prizes. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, $25, awarded to Philip Ferry Whitmore.

Second prize, $15, awarded to Ralph P. Hotis.

Third prize, $10, awarded to Waldo Atwood Cleveland.

General Improvement. — The Western Alumni Association prize, given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example, was $25. Awarded to Daniel Johnston MacLeod.

Hills Botanical Prizes. — Hills prizes for the best and second best herbarium, competition open to members of the senior, junior and sophomore classes, were awarded as follows: —

First prize of $20 awarded to Ernest Elwood Stanford of the senior class.

Second prize of $15 awarded to Dana Otis Merrill of the sophomore class.

Public Speaking (previously announced). — The Burnham prizes were awarded to the students delivering the best and second best declarations, as follows: —

First prize, $15, awarded to N. N. Worthley, 1918.

Second prize, $10, awarded to L. E. Wolfson, 1918.

The Flint prizes were awarded to the students delivering the best and second best orations, as follows: —

First prize, $20, awarded to H. L. Russell, 1918.

Second prize, $15, awarded to L. D. Kelsey, 1917.

Interclass Debate. — Won by the Freshman Debating Team, composed of D. M. Lipshires, $15, H. L. Russell, $15, and L. E. Wolfson, $15.

Prize College Debate. — H. K. Foster, 1918, D. M. Lipshires, 1918, and H. L. Russell, 1918, — silver cup to each.

Military Honors. — The following-named cadet officers have been reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts as being efficient in military science and tactics and graduating therein with highest honors: —

Cadet Col. D. J. Lewis.
Cadet Maj. P. F. Whitmore.
Cadet Maj. A. E. Wilkins.
Cadet Capt. E. C. Towne.
Cadet Capt. H. H. White.
Cadet Capt. R. W. Harvey.
Cadet Capt. A. J. Flebut.
Cadet Capt. S. K. Farrar.
Cadet Capt. M. J. Clough.
Cadet Capt. R. E. McLain.
Cadet Capt. G. F. Hyde.
Cadet Capt. H. D. Grant.

SECRETARIES OF ALUMNI ASSOCIATIONS.

Associate Alumni of the Massachusetts Agricultural College.
Secretary: Dr. Charles A. Peters, 1897, Amherst, Mass.

Alumni Secretaries' Association of the Massachusetts Agricultural College.
Secretary: Ralph J. Watts, 1907, Amherst, Mass.

Alumni Club of Massachusetts.
Secretary: P. W. Pickard, 1911, 43 Chatham Street, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
Secretary: Paul E. Alger, 1909, Great Barrington, Mass.

Massachusetts Agricultural College Club of New York.
Secretary: Dr. John Ashburton Cutter, 1882, 266 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.
Secretary: Dr. William A. Hooker, 1900, U. S. D. A., Office of Experiment Stations, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
Secretary: Charles A. Tirrell, 1906, 815 Steinway Hall, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
Secretary: Thomas F. Hunt, 1905, Berkeley, Cal.

Massachusetts Agricultural College Club of Hawaii.
Secretary: Dr. E. A. Back, 1904, Honolulu, T. H.

Class Secretaries.

Class of	Secretary.	Secretary's Address.
1871	E. E. Thompson,	5 Jacques Avenue, Worcester, Mass.
1872	F. E. Kimball,	8 John Street, Worcester, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	D. G. Hitchcock,	Warren, Mass.
1875	– –	– –
1876	C. Fred Deuel,	Amherst, Mass.
1877	Atherton Clark,	231 Waverley Avenue, Newton, Mass.
1878	C. O. Lovell,	201 Darke Block, Regina, Saskatchewan, Can.
1879	R. W. Swan,	41 Pleasant Street, Worcester, Mass.
1880	Alvan L. Fowler,	413 Post Office Building, Philadelphia, Pa.
1881	J. L. Hills,	59 North Prospect Street, Burlington, Vt.
1882	G. D. Howe,	25 Winter Street, Bangor, Me.
1883	J. B. Lindsey,	Amherst, Mass.
1884	E. A. Jones,	New Canaan, Conn.
1885	E. W. Allen,	1923 Biltmore Street, Washington, D. C.
1886	Winfield Ayres,	616 Madison Avenue, New York City.
1887	F. H. Fowler,	Shirley, Mass.
1888	H. C. Bliss,	14 Mechanic Street, Attleboro, Mass.
1889	F. W. Davis,	85 Colberg Avenue, Roslindale, Mass.
1890	David Barry,	398 Walnut Street, Newtonville, Mass.
1891	H. T. Shores,	177 Elm Street, Northampton, Mass.
1892	H. M. Thomson,	Amherst, Mass.
1893	F. A. Smith,	Hathorne, Mass.
1894	S. F. Howard,	Northfield, Vt.
1895	E. A. White,	Ithaca, N. Y.
1896	A. S. Kinney,	South Hadley, Mass.
1897	C. A. Peters,	Amherst, Mass.
1898	W. S. Fisher,	Peace Street Grammar School, Providence, R. I.
1899	D. A. Beaman,	Rio Piedras, Porto Rico.
1900	E. K. Atkins,	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass.
1902	H. L. Knight,	1420 Buchanan Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	Sherborn, Mass.
1905	A. D. Taylor,	1900 Euclid Avenue, Cleveland, O.
1906	Richard Wellington,	St. Anthony Park, Minnesota.
1907	Clinton King,	31 Elm Street, Springfield, Mass.
1908	S. T. Wright,	17 Camp Street, Norwalk, Conn.
1909	O. B. Briggs,	1015 Fidelity Building, Baltimore, Md.
1910	F. L. Thomas,	Auburn, Ala.
1911	L. M. Johnson,	Newtown, Conn.
1912	F. S. Madison,	East Greenwich, R. I.
1913	B. W. Ellis,	Bournedale, Mass.
1914	L. Ernest Smith,	Colchester, Conn.
1915	P. F. Whitmore,	Sunderland, Mass.

Degrees Conferred and Roll of Students.

Degrees Conferred — 1915.

Doctor of Philosophy (Ph.D.).

Holland, Edward Bertram, Amherst, Mass., Massachusetts Agricultural College, M.Sc.
Hutson, John Coghlan, Barbados, W. I., Massachusetts Agricultural College, M.Sc.
Martin, James Francis, Amherst, Mass., Massachusetts Agricultural College, M.Sc.
Parker, Ralph Robinson, Malden, Mass., Massachusetts Agricultural College, M.Sc.
Regan, William Swift, Northampton, Mass., Massachusetts Agricultural College, B.Sc.

Master of Science (M.Sc.).

Bogue, Robert Herman, North Amherst, Mass., Tufts College, B.Sc.
Brown, Henry Leavitt, Ayer, Mass., University of Maine, B.Sc.
Hasey, Willard Harrison, Brockton, Mass., Massachusetts Agricultural College, B.Sc.
Norton, John Buck, Hartford, N. Y., University of Vermont, B.Sc.
Root, George Albert, Danbury, Conn., Connecticut Agricultural College, B.Sc.

Bachelor of Science (B.Sc.).

Alden, Charles Harold, ... Amherst.
Allen, Francis Ellwood, ... Melrose.
Archibald, Herbert Hildreth, ... Waltham.
Banister, Seth Warrener, ... Westford.
Bartlett, Edward Russell, ... Newburyport.
Bartley, Hastings Newcomb, ... Sandwich.
Bemis, Willard Gilbert, ... North Brookfield.
Bennett, John Ingram, ... Boston.
Bishop, Chester Allen, ... Peterboro, N. H.
Brooks, Gardner Milton, ... Boston.
Buell, Frank Weed, ... New Haven, Conn.
Burt, Helen Frances, ... West Somerville.
Buttrick, John Willard, ... Melrose.
Cale, Gladstone Hume, ... Springfield.
Cande, Donald Hopkins, ... Pittsfield.
Chase, Alexander Baxter, Jr., ... West Barnstable.
Clark, Ellis Fred, ... Granby, Conn.
Cleveland, Waldo Atwood, ... Baldwinsville.
Clough, Maurice Joseph, ... Boston.
Dalrymple, Andrew Campbell, ... Revere.
Damon, Leon Blanchard, ... Melrose.
Day, George Allen, ... Warren.
Dole, Sumner Alvord, ... Shelburne.
Doran, William Leonard, ... North Dartmouth.
Draper, Earle Sumner, ... Milford.
Farrar, Stuart Kittridge, ... Springfield.
Fitzgerald, Daniel James, ... Worcester.
Flebut, Alpha John, ... Amherst.
Frost, Robert Theodore, ... New York, N. Y.
Fuller, Richard, ... Salem.
Goodwin, Malcolm Noyes, ... Newburyport.
Grant, Harold Davidson, ... Methuen.
Griggs, Raymond Bradford, ... Chicopee Falls.
Hall, George Morris, ... Brookline.
Hall, Roderick Chesley, ... Worcester.
Harper, James Edward, ... New Haven, Conn.
Harvey, Russell Wilton, ... Lanesville.

Haskell, Willis Henry, Jr.,	Brooklyn, N. Y.
Hatfield, William Hollis,	Wellesley.
Hildreth, Paul Hughes,	Newtonville.
Hotis, Ralph P.,	Evans Mills, N. Y.
Hyde, George Frederick,	Hartford, Conn.
Hyde, Harold Gilmore,	Winchendon.
Johnson, Arthur,	Bridgeport, Conn.
Kelleher, Jerome Joseph,	Turners Falls.
Kennedy, Worthington Chester,	Hardwick.
Lane, Merton Chesleigh,	South Duxbury.
Le Duc, Ashley Cudworth,	Chesterfield.
Lewis, Daniel James,	Hanson.
Lewis, John Kirby,	New Haven, Conn.
Lincoln, Irving Boin,	Glens Falls, N. Y.
Lovejoy, John Sumner,	Newburyport.
MacNeil, Ralph Langdel,	Chelsea.
Macy, Philip Arthur,	Oak Bluffs.
Marsh, Franklin Winter,	Amherst.
Marsh, Herbert Verner,	Deerfield.
Massé, Sidney Merton,	Dorchester.
McKechnie, Ray Farrar,	Natick.
McLain, Ralph Emerson,	Melrose.
Melican, George Deady,	Worcester.
Moberg, Eldon Samuel,	Campello.
Montague, Enos James,	Northampton.
Moore, Roger Henry,	Beverly.
Navas, Miguel,	Barranquilla, Colombia, S. A.
Parker, Edwin Kenney,	Northampton.
Parmenter, Ernest Brigham,	Franklin.
Patterson, Robert Earley,	Dorchester.
Pendleton, Harlow Libby,	Dorchester.
Perry, Gerald Eugene,	Amherst.
Pike, Joseph Stevens, Jr.,	Somerville.
Potter, George Raymond,	Ludlow.
Price, James Albert,	New York, N. Y.
Rhoades, Paul Whitney,	Malden.
Rogers, Harold Merriman,	Southington, Conn.
Sauchelli, Vincent,	Waterbury, Conn.
Sears, William Richard,	Woburn.
Severance, Verne Lincoln,	South Hanson.
Sherman, Milton Francis,	South Lincoln.
Simon, Isaac Barney,	Revere.
Slein, Owen Francis,	New Braintree.
Smith, Hyde,	Worcester.
Spicer, Eber Grant,	New York, N. Y.
Spofford, Chester Porter,	South Groveland.
Stanford, Ernest Elwood,	Amherst.
Tarr, Lester Winslow,	Rockport.
Tower, Ralph Ernest,	Becket.
Tower, William Reginald,	Sheffield.
Towne, Edwin Chester,	Waltham.
Upton, Raymond Melville,	Peabody.
Vener, Benjamin,	Brockton.
Vinal, Stuart Cunningham,	Boston.
Walker, Herman Chester,	Holyoke.
Wellington, Benjamin,	Waltham.
White, Henry Harrison,	West Peabody.
Whitmore, Philip Ferry,	Sunderland.
Whorf, Paul Francis,	Caribou, Me.
Wilkins, Alfred Emerson,	Wakefield.
Willey, Harold Cleland Clancey,	Orange.
Williams, Donald,	Catasauqua, Pa.
Wright, Elvin Stanley,	Worcester.
Zehrung, Samuel Danford,	Roseville, O.

Roll of Students.

Graduate Students — Candidates for a Degree.

Anderson, David Wadsworth, ... Manchester, N. H.
B.Sc., New Hampshire State College.
Armstrong, Robert Pierson, ... Rutherford, N. J.
B.Sc., Massachusetts Agricultural College.
Avery, Roy Crowdy, ... New York City.
B.Sc., Connecticut Agricultural College.
Baird, Charles Glenn, ... Powell, Wyo.
A.B., University of Kansas; A.M., University of Wyoming.
Bales, Harold C., ... North Amherst.
A.B., Dartmouth College.
Beals, Carlos Loring, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Bourne, Arthur Israel, ... Amherst.
A.B., Dartmouth College.
Bronson, Wesley Hotchkiss, ... Amherst.
B.Sc., New York State College of Agriculture.
Chapman, George Henry, ... Amherst.
B.Sc. and M.Sc., Massachusetts Agricultural College.
Christopher, Paul F., ... Hadley.
B.Sc., Colby College.
Clapp, Raymond K., ... Easthampton.
B.Sc., Massachusetts Agricultural College.
Cobb, J. Stanley, ... Groton, N. Y.
B.Sc., Cornell University.
Copson, Godfrey V., ... Corvallis, Ore.
B.Sc. in agriculture, Oregon Agricultural College.
Davies, Ernest Langford, ... Guelph, Can.
B.Sc., Ontario Agricultural College.
Doran, William Leonard, ... North Dartmouth.
B.Sc., Massachusetts Agricultural College.
Erichsen, Alexander J., ... Atlantic City, N. J.
B.Sc., Pennsylvania State College.
Fish, Ernest Ellsworth, ... Wyalusing, Pa.
B.Sc., Pennsylvania State College.
Flebut, Alpha John, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Hood, Egerton Gibson, ... Hagermon, Ontario, Can.
B.Sc.A., Ontario Agricultural College.
Itano, Arao, ... Okayamaken, Japan.
B.Sc., Michigan Agricultural College.
Johnson, Leonard H., ... Monticello, India.
B.S. in agriculture, Purdue University.
Lund, Russell Fort, ... Amherst.
B.A., St. Lawrence University.
MacDougall, Allister F., ... Northampton.
B.Sc., Massachusetts Agricultural College.
MacNeil, Ralph Langdel, ... Chelsea.
B.Sc., Massachusetts Agricultural College.

McKechnie, Ray F., ... Natick.
B.Sc., Massachusetts Agricultural College.
Merkle, Frederick Grover, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Morgan, Ezra L., ... Amherst.
A.B., McKendree College; M.A., University of Wisconsin.
Mutkekar, Satwaji Gundoji, ... Belgaum, Ind.
B.Agr., Poona Agricultural College.
Payne, William Thomas, ... Oklahoma City, Okla.
Oklahoma Agricultural and Mechanical College.
Peckham, Curtis, ... New Bedford.
B.Sc., Massachusetts Agricultural College.
Perry, Gerald Eugene, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Phillips, Arthur W., ... Somerville.
B.Sc. in chemistry, Tufts College.
Porter, Bennett Allen, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Read, Frederick W., ... Boston.
B.Sc., Massachusetts Agricultural College.
Root, Irving C., ... Kansas City, Kan.
B.Sc., Kansas State Agricultural College.
Ruprecht, Rudolph W., ... Flatbush, N. Y.
B.Sc. and M.Sc., Massachusetts Agricultural College.
Serex, Paul, Jr., ... Amherst.
B.Sc., Massachusetts Agricultural College.
Smith, Raymond Goodale, ... Lynn.
B.Sc., Massachusetts Agricultural College.
Strand, Carl J., ... Amherst.
A.B., Augustana College; M.S., University of Illinois.
Taylor, Leland H., ... Peabody.
B.Sc., Massachusetts Agricultural College.
Thurston, Arthur S., ... Everett.
B.Sc., Massachusetts Agricultural College.
Vinal, Stuart C., ... East Weymouth.
B.Sc., Massachusetts Agricultural College.
White, Donald, ... Wakefield.
A.B., Harvard College.
White, Edward Albert, ... Ithaca, N. Y.
B.Sc., Massachusetts Agricultural College.

GRADUATE STUDENTS — NOT CANDIDATES FOR A DEGREE.

Emery, Barton C., ... Amherst.
A.B., Bowdoin College.
Fenn, Donald F., ... Cambridge.
A.B., Harvard College.
Harris, Margaret, ... Deerfield.
A.B., Wellesley College.
Karlson, Hugo P., ... Orange.
A.B., Clark College.
Lovejoy, John Sumner, ... Newburyport.
B.Sc., Massachusetts Agricultural College.
Middleton, Frederick Heard, ... Brookline.
A.B., Harvard University.
Morgan, Denison, ... New Haven, Conn.
A.B., Yale University.
Porter, Margaret Love, ... Amherst.
M.A., Columbia University.

SENIOR CLASS.

Aiken, Harold,	Millis,	Lambda Chi Alpha.	
Anderson, Frank Albert,[1]	Somerville,	Phi Sigma Kappa.	
Andrews, Francis Marshall, Jr.,	Manchester,	53 Lincoln Avenue.	
Barnes, Dwight Fletcher,	Bedford,	East Experiment Station.	
Barnes, Fred Leslie Walker,[1]	Plymouth,	16 South College.	
Bishop, Herbert Walker,	Doylestown, Pa.,	Alpha Sigma Phi.	
Blanpied, Nelson Uhler,	Framingham,	13 South College.	
Boyer, Edward Everett Hale,[1]	Lynn,	5½ East Pleasant Street.	
Brazil, William Henry,	Leominster,	12 South College.	
Caldwell, Harold Nute,[1]	Lowell,	M. A. C. Farm House.	
Cardarelli, Emilio Joseph,	Boston,	West Experiment Station.	
Chase, Esther Helen,	Holden,	Draper Hall.	
Chisholm, Raymond Lincoln,	Melrose Highlands,	Phi Sigma Kappa.	
Clapp, Raymond Luckey,	Northfield,	11 South College.	
Clark, Saxon Dickinson,	Springfield,	2 South College.	
Coe, Alfred Lynn,	Fayetteville, N. Y.,	Beta Kappa Phi.	
Coleman, Albert Sumner,	Mendon,	11 South College.	
Coley, William Stanton,[1]	Wilton, Conn.,	15 North College.	
Courchene, Alcide Telesphor,[1]	North Adams,	Mount Pleasant.	
Curran, Harry Ambrose,	Marlborough,	2 North College.	
Cushing, Raymond Alonzo,[1]	West Somerville,	14 South College.	
Danforth, George Newlon,[1]	Foxcroft, Me.,	Kappa Sigma.	
Darling, Homer Chester,	Mendon,	7 South College.	
Davis, Frank Leslie,	Milford,	South College.	
Dickinson, William Cowls,	North Amherst,	North Amherst.	
Dodge, Walter Eugene,	Geneva, O.,	14 South College.	
Eldredge, Raymond Chase,	North Abington,	2 South College.	
Estes, Ralph Cary,[1]	South Framingham,	15 South College.	
Fernald, Charles Henry, 2d,	Amherst,	44 Amity Street.	
Fielding, Lester Edward,[1]	Malden,	1 South College.	
Gaventa, Harry Reymer,	Swedesboro, N. J.,	11 North College.	
Gilmore, Benjamin Anthony,	Acushnet,	Beta Kappa Phi.	
Gioiosa, Alfred Anthony,	Dorchester,	Alpha Sigma Phi.	
Glover, Theodore Whitford,	South Duxbury,	Lambda Chi Alpha.	
Goodwin, Clinton Foster,	Haverhill,	Lambda Chi Alpha.	
Googins, Burton,	Amherst,	Baker Place.	
Gould, Charles Holt,	Hubbardston,	Theta Chi.	
Gunn, Carlton Merrick,	Sunderland,	Beta Kappa Phi.	
Hager, Clayton Marden,	Somerville,	13 South College.	
Hall, Stanley William,	Saxonville,	3 South College.	
Harris, William Lombard, Jr.,	Deerfield,	53 Lincoln Avenue.	
Harrocks, Thomas Lincoln,	Westminster,	15 North College.	
Hart, Reginald,	Montague City,	10 North College.	
Haskell, Frank Eugene,	Northborough,	11 North College.	
Hathaway, Charles Edward, Jr.,	Somerset,	13 South College.	
Hemenway, Justin Stanley,	Williamsburg,	9 North College.	
Hendry, Arthur Ekman,[1]	Milton,	M. A. C. Apiary.	
Hicks, Albert James,	Amherst,	4 Chestnut Street.	
Holden, Mae Faustina,	Royalston,	Draper Hall.	
Hunt, Reginald Stuart,[1]	Newtonville,	2 South College.	
Huntington, Charles Albert, Jr.,	Poquonock, Conn.,	Kappa Sigma.	
Jerome, Fred William,	Stockbridge,	9 South College.	
Jones, Linus Hale,	Milford,	Mount Pleasant.	
Jordan, Perley Balch,	Topsfield,	14 South College.	
Kelly, Harold Russell,	Haverhill,	Pease Avenue.	
Kilbon, Ralph Gillette,	Springfield,	4 South College.	
King, Edward Lee,	Norwood,	8 South College.	
Knapton, Guy Lord,[1]	Lawrence,	Pease Avenue.	
Laird, Kenneth Bradford,	Brockton,	79 Pleasant Street.	

[1] Work incomplete.

Lieber, Conrad Hugo,	Jamaica Plain,	3 North College.
Lindquist, Albert Evert,	Roxbury,	3 North College.
Little, Harold Greenleaf,	Newburyport,	4 South College.
Locke, Wilbur Trow,	Lawrence,	Alpha Sigma Phi.
Lyford, Waldo Preston,	Natick,	13 South Prospect Street.
Mahan, Harold Butterworth,	Manchester, N. H.,	15 South College.
Mattoon, Harold Gleason, [1]	Pittsfield,	12 South College.
Mooney, Raymond Alson,	Plattsburgh, N. Y.,	Alpha Sigma Phi.
Moses, Charles Wicker,	Ticonderoga, N. Y.,	3 South College.
Mostrom, Harold Augustus,	North Middleborough,	10 Nutting Avenue.
Murphy, John William,	Beverly,	Phi Sigma Kappa.
Nash, Clayton Wells,	South Weymouth,	12 North College.
Nicholson, James Thomas, [1]	Leominster,	12 South College.
Palmer, George Bradford,	Brookline,	3 South College.
Perry, Edgar Adams,	Attleboro,	Alpha Sigma Phi.
Plaisted, Philip Asbury,	Arlington,	Phi Sigma Kappa.
Potter, David,	Concord,	20 South College.
Prouty, Stanley Marshall,	North Brookfield,	Kappa Sigma.
Ray, George Burrill,	Hingham,	3 North College.
Rich, Gilbert Warren, [1]	Hingham,	15 South College.
Richards, Everett Stackpole,	Hatfield,	1 South College.
Ricker, Dean Albert, [1]	Worcester,	7 North College.
Rogers, Tyler Stewart,	Framingham,	Phi Sigma Kappa.
Rowe, Louis Victor, [1]	Melrose,	16 South College.
Russell, Ernest Samuel,	South Hadley,	Kappa Sigma.
Ryan, William Edward, Jr.,	Stoughton,	12 North College.
Sander, Benjamin Charles Louis,	Cambridge,	Theta Chi.
Sanderson, Everett Shovelton,	Centreville, R. I.,	12 North College.
Scheufele, Frank Joseph,	South Natick,	Phi Sigma Kappa.
Schlotterbeck, Lewis,	Roxbury Station, Conn.,	Alpha Sigma Phi.
Selkregg, Edwin Reimund, [1]	North East, Pa.,	10 South College.
Sherinyan, Donald Suran, [1]	Los Angeles, Cal.,	5 North College.
Simmons, Perez,	Pittsfield,	Lambda Chi Alpha.
Stearns, Frederick Campbell, [1]	Waltham,	10 North College.
Strauss, Abraham,	Roxbury,	Clark Hall.
Swan, Durelle,	Dorchester,	18 Nutting Avenue.
Taber, Ralph Fred,	Cooperstown, N. Y.,	Mount Pleasant.
Topham, Alfred, [1]	Lawrence,	13 North College.
Upham, Thomas Carlton,	Fitchburg,	53 Lincoln Avenue.
Verbeck, Howard Graves,	Malden,	Phi Sigma Kappa.
Walkden, Herbert Halden,	Westford,	2 North College.
Walker, Henry Marshall, [1]	Brookline,	2 North College.
Wentworth, Everett Lawrence,	East Dover, Vt.,	M. A. C. Plant House.
Wetherbee, Raymond Scott,	Waltham,	11 North College.
Whitney, Harold Tichenor, [1]	Mount Vernon, N. Y.,	7 North College.
Whitney, Leon Fradley,	Brooklyn, N. Y.,	Kappa Sigma.
Wies, Calmy,	Malden,	31 Pleasant Street.
Wildon, Carrick Earl,	Melrose Highlands,	14 North College.
Woolley, Harold Curtis, [1]	Malden,	4 South College.

JUNIOR CLASS.

Babcock, Philip Rodney, [1]	Lynn,	Kappa Sigma.
Barnes, Herbert Wesley,	Whitinsville,	Commons Club.
Behrend, Oswald,	Natick,	Commons Club.
Bell, Alfred Whitney, Jr., [1]	West Newton,	53 Lincoln Avenue.
Birchard, John Dixon, [1]	Springfield,	Phi Sigma Kappa.
Boles, Robert Stewart,	Dorchester,	Beta Kappa Phi.
Bonn, Wesley Copeland,	Grafton,	Commons Club.
Booth, Alfred, [1]	Middletown, N. Y.,	Baker Place.
Boyce, Harold Prescott, [1]	Haverhill,	7 Nutting Avenue.
Buckman, Lewis Taylor,	Wilkes-Barre, Pa.,	Theta Chi.

[1] Work incomplete.

Buttrick, David Herbert,	Arlington,	Phi Sigma Kappa.
Carruth, Glenn Howard,[1]	Orange,	Physics Building.
Chamberlin, Frank Shirley,	Framingham,	Commons Club.
Clough, Charles Henry,[1]	Dedham,	Beta Kappa Phi.
Cross, Walter Irving,[1]	Hingham Center,	53 Lincoln Avenue.
Curtin, Charles Warren,[1]	Newton,	Lambda Chi Alpha.
Davis, Monsell Henry,	Orange, N. J.,	120 Pleasant Street.
Day, James Harold,[1]	Hatfield,	8 North College.
Dempsey, Paul Wheeler,	Dorchester,	Lambda Chi Alpha.
Dickey, Harold Gammell,	Dorchester,	6 South College.
Dizer, John Thomas,	East Weymouth,	East Experiment Station.
Duffill, Edward Stanley,	Melrose Highlands,	8 Allen Street.
Dunham, Henry Gurney,[1]	West Bridgewater,	Beta Kappa Phi.
Edwards, Francis Gill,[1]	Beverly,	Phi Sigma Kappa.
Elliot, Ralph William,	Chartley,	Flint Laboratory.
Everbeck, George Charles,[1]	Boston,	87 Pleasant Street.
Fearing, Ralph Watson,	Dorchester,	Commons Club.
Fisher, George Basil,[1]	Millbury,	Theta Chi.
Flagg, Wayne McCrillis,[1]	Mittineague,	Beta Kappa Phi.
Flint, Oliver Simeon,	Lowell,	120 Pleasant Street.
Goldstein, Maurice,[1]	Lynn,	58 Pleasant Street.
Graham, Leland Jenkins,[1]	Amherst,	Lincoln Avenue.
Grayson, Emory Ellsworth,	Milford,	Alpha Sigma Phi.
Gurshin, Carl Alfred,	Lynn,	35 North Prospect Street.
Hagelstein, Charles Henry,[1]	Dorchester,	4 North College.
Hallett, Charles Hiram,[1]	Mansfield,	Theta Chi.
Harlow, Frank Edward,	Malden,	77 Pleasant Street.
Harlow, Paul Goodhue,	Malden,	Phi Sigma Kappa.
Henderson, Elliott,	Boston,	7 South College.
Henninger, Roswell Woodward,	Williamsport, Pa.,	3 McClellan Street.
Higginbotham, Harry,[1]	Taunton,	North College.
Hill, Edmund Baldwin,[1]	Rutherford, N. J.,	Alpha Sigma Phi.
Holden, Richard Lynde,	Haverhill,	Lambda Chi Alpha.
Holder, Ralph Clifton,	South Braintree,	17 Kellogg Avenue.
Hubbell, Franklin Homer,	Westport, Conn.,	M. A. C. Farm House.
Hyde, Stanley Winship,[1]	Malden,	66 Pleasant Street.
Irving, William Raymond,	Taunton,	North College.
Jackson, Richmond Merrill,[1]	Georgetown,	Commons Club.
Kelsey, Edmund Dean,[1]	Amherst,	Commons Club.
Kelsey, Lincoln David,	West Hartford, Conn.,	Beta Kappa Phi.
Kinsman, Alfred Oberlin, Jr.,[1]	Merrimac,	Lambda Chi Alpha.
Larson, Frederick Christian,[1]	Everett,	4 North College.
Latham, Paul Walker,	Norwichtown, Conn.,	Kappa Sigma.
Lawrence, Milford Robinson,	Falmouth,	Kappa Sigma.
Light, Brooks,[1]	Milton,	15 North College.
Livermore, William Tingley,	Lawrence,	83 Pleasant Street.
Loring, Albert Briggs,	Nantasket Beach,	Stockbridge Hall.
Lydiard, Harry Crowther,[1]	Hartford, Conn.,	3 Nutting Avenue.
Mack, Walter Adams,	Springfield,	8 North College.
MacLeod, Daniel Johnston,[1]	Wakefield,	Hillside Avenue.
Marchant, Horace Greenough,[1]	Cambridge,	5 Fearing Street.
Mather, Fred,[1]	Amherst,	Veterinary Laboratory.
Mayo, Frank Willard,[1]	Houlton, Me.,	Phi Sigma Kappa.
Mayo, William Irving, Jr.,	Framingham Center,	M. A. C. Farm House.
Merrill, Dana Otis,[1]	East Pepperell,	Commons Club.
Moorhouse, Newell,	Worcester,	5 South College.
Nash, Herman Beaman,	Amherst,	Amherst, R. F. D. No. 1.
Nelson, John Brockway,[1]	Newburyport,	Baker Place.
Noyes, Samuel Verne,	Georgetown,	Beta Kappa Phi.
Pierce, Harold Barnard,	Kansas City, Mo.,	80 Pleasant Street.
Pike, Chester Arthur,[1]	Smith's,	Mathematics Building.
Pratt, Harold Arthur,	Shrewsbury,	Lambda Chi Alpha.

[1] Work incomplete.

Quimby, Charles Frederick,	Cape Neddick, Me.,	83 Pleasant Street.
Randall, Earle MacNeill,	Winchester,	Lambda Chi Alpha.
Richardson, Lewis Elmer,	Rockville,	Lambda Chi Alpha.
Rodger, Raymond Miller,	Everett,	Beta Kappa Phi.
Rogers, Roland Winsor,	Braintree,	25 Lincoln Avenue.
Rorstrom, Hans Alfred,	Boston,	M. A. C. Farm House.
Ross, Louis Warren,[1]	Arlington,	Phi Sigma Kappa.
Saidel, Harry Samuel,[1]	Worcester,	3 Nutting Avenue.
Sargent, George Leonard,[1]	Merrimac,	17 Kellogg Avenue.
Saunders, William Putnam,	Lawrence,	116 Pleasant Street.
Sauter, John Martin,[1]	Turners Falls,	60 Pleasant Street.
Saville, William, Jr.,	Waban,	20 South College.
Schaefer, Leonard Charles,[1]	Holyoke,	Entomology Building.
Schwab, Andrew Nathan,[1]	Yalesville, Conn.,	Plant House.
Shumway, Paul Edward,[1]	Greenfield,	60 Pleasant Street.
Sims, James Stanley,[1]	Melrose,	Phi Sigma Kappa.
Smith, Herbert Dwight,	Northampton,	60 Pleasant Street.
Smith, Richard Woodworth,	Pittsfield,	Kappa Sigma.
Spaulding, Almon Whitney,	Dorchester,	16 South College.
Squires, Paul Revere,[1]	Belchertown,	Belchertown.
Stearns, Carlton McIntyre,[1]	Melrose,	120 Pleasant Street.
Stiles, Albert Ralph,[1]	Arlington Heights,	8 South College.
Stowell, Harold Thurber,[1]	Amherst,	193 South Pleasant Street.
Thayer, William Wallace,	Winter Hill,	Lambda Chi Alpha.
Tuthill, Samuel Fuller,	Mattapoisett,	M. A. C. Farm House.
Upson, Everett Langdon,[1]	New Britain, Conn.,	87 Pleasant Street.
Walbridge, Henry Blood,	Bennington, Vt.,	M. A. C. Farm House.
Warner, Merrill Pomeroy,	Sunderland,	5 South College.
Warren, Harold Manson,[1]	Melrose,	13 North College.
Warren, James Joseph,	North Brookfield,	Commons Club.
Webster, Frank Cedric,	Harvard,	Mathematics Building.
Westman, Robert Clayton,	Roslindale,	Baker Place.
Whitcomb, Warren Draper,[1]	Waltham,	Theta Chi.
Whitney, Joseph Fradley,[1]	Brooklyn, N. Y.,	Kappa Sigma.
Wilber, Charles Raymond,	Walpole,	French Hall.
Wilcox, Timothy Palmer,	Andover,	Alpha Sigma Phi.
Williams, Arthur Franklin,[1]	Sunderland,	6 South College.
Williams, Herbert Clifton,[1]	South Hadley Falls,	Whitney Street.

Sophomore Class.

Additon, Elizabeth Emery,	Newton Center,	Draper Hall.
Allen, Amos Lawrence,	Dalton,	87 Pleasant Street.
Allen, Leland Christy,[1]	Holyoke,	120 Pleasant Street.
Allen, Ralph Emerson,	Everett,	Commons Club.
Babbitt, Frank Madison,	Fairhaven,	M. A. C. Farm House.
Bainbridge, Frank Benedict,	Paterson, N. J.,	6 South College.
Baker, Foster Kenneth,	Fairhaven,	Entomology Building.
Baker, Henry Raymond,[1]	Amherst,	West Street.
Barton, George Wendell,	North Sudbury,	36 North Prospect Street.
Bent, Winthrop Herbert,[1]	Watertown,	87 Pleasant Street.
Binks, Frank Joseph,	Maynard,	Beta Kappa Phi.
Boaz, William Henry,[1]	Covesville, Va.,	Phi Sigma Kappa.
Boyd, Robert Lucius,[1]	Lynn,	3 Nutting Avenue.
Brigham, Sylvia Bowen,	Newtonville,	Draper Hall.
Bruce, Walter Griffith,	Springfield,	21 Fearing Street.
Buchanan, Walter Gray,[1]	Chicopee,	97 Pleasant Street.
Buck, Rollin Hugh,	Worcester,	Beta Kappa Phi.
Burtch, Chester Swan,	New Bedford,	Theta Chi.
Calderwood, Herbert Hale,[1]	Rockport, Me.,	Kappa Sigma.
Canlett, Franklin Harwood,	Bedford,	36 North Prospect Street.
Capen, Howard Boyden,[1]	Canton,	Lambda Chi Alpha.

[1] Work incomplete.

Carlson, Fred Albert,	Pittsfield,	84 Pleasant Street.
Carter, Thomas Edward,	West Andover,	Lambda Chi Alpha.
Chamberlain, Sumner Fiske,[1]	Holden,	Commons Club.
Chambers, Roger James,[1]	Dorchester,	Alpha Sigma Phi.
Chapman, John Alden,	Salem,	10 Nutting Avenue.
Clapp, Roger Francis,	Salem,	79 Pleasant Street.
Clark, Stewart Sandy,[1]	Holyoke,	120 Pleasant Street.
Davis, Dwight Shaw,	Derry, N. H.,	66 Pleasant Street.
Dillon, Thomas Stevenson,	West Warren,	Aggie Inn.
Dowd, William Lawrence,[1]	North Amherst,	North Amherst.
Duncan, George James,[1]	Arlington,	3 Nutting Avenue.
Dunn, Arthur Paul,[1]	Malden,	29 McClellan Street.
Durfee, Norman Owen,[1]	Fall River,	Alpha Sigma Phi.
Edes, David Oliver Nourse,[1]	Bolton,	Lambda Chi Alpha.
Ellis, Ralph Chick,[1]	West Newton,	3 Nutting Avenue.
Emmerich, Louis Philip,[1]	Paterson, N. J.,	9 South College.
Erickson, George Edwin,	Brockton,	Lincoln Avenue.
Faber, Edward Stuart,[1]	Plainfield, N. J.,	Theta Chi.
Faneuf, Leo Joseph,[1]	West Warren,	Birch Lawn.
Farrar, Delwin Bruce,[1]	Amherst,	1 Dana Street.
Fellows, Harold Carter,[1]	Peabody,	Commons Club.
Ferriss, Samuel Boynton,	New Milford, Conn.,	Beta Kappa Phi.
Foley, William Albert,	Palmer,	35 North Prospect Street.
Foster, Hamilton Knight,[1]	New Rochelle, N. Y.,	24 Beston Street.
Foster, Roy Wentworth,	Lynn,	6 Nutting Avenue.
Francis, Donald Smith,[1]	Athol,	Beta Kappa Phi.
Fraser, Charles Allen,[1]	Plymouth,	Baker Place.
Frellick, Arthur Lester,	Everett,	13 Phillips Street.
Fuller, Camille Baldwin,	West Quincy,	Commons Club.
Garvey, Mary Ellen Monica,	Amherst,	27 South Prospect Street.
Gasser, Thomas Jefferson,	Uxbridge,	Lincoln Avenue.
Gifford, Flavel Mayhew,	West Tisbury,	Commons Club.
Gillette, Nathan Warner,	Revere,	5 South College.
Goodridge, George Lucien,[1]	Melrose,	Lambda Chi Alpha.
Goodwin, William Irving,[1]	Haverhill,	Lambda Chi Alpha.
Gordon, Frederick George,	Plymouth,	North Pleasant Street.
Gray, Milton Berford,[1]	Woods Hole,	13 Phillips Street.
Grayson, Forrest,	Milford,	Lincoln Avenue.
Haines, Foster Kingsley,	Peabody,	120 Pleasant Street.
Hance, Forrest Sansbury,[1]	Paterson, N. J.,	3 Nutting Avenue.
Harris, Warren Timothy,[1]	Millbury,	60 Pleasant Street.
Harwood, Ralph Wallace,	Barre,	Phi Sigma Kappa.
Hawley, Robert Dorman,	Springfield,	Phi Sigma Kappa.
Heffron, Paul John,[1]	Sherborn,	Birch Lawn.
Higgins, Leo Clement,	Amesbury,	Poultry Plant.
Holmes, George Frederick,	Ipswich,	30 North Prospect Street.
Holmes, Robert Palmer,[1]	Wakefield,	Kappa Sigma.
Howard, Arthur Merchant,	Pittsfield,	84 Pleasant Street.
Howe, Albert Edward,[1]	Needham,	Lincoln Avenue.
Howe, George Cole,	Worcester,	Lincoln Avenue.
Howes, Donald Francis,	Ashfield,	Birch Lawn.
Hunnewell, Paul Fiske,[1]	Winthrop,	13 Phillips Street.
Huntoon, Douglas Henderson,	Norwood,	13 Phillips Street.
Hurlburt, Ralph Walter,	Ashley Falls,	94 Pleasant Street.
Ingalls, Irving Weaver,[1]	Brooklyn, N. Y.,	Beta Kappa Phi.
Jackson, Charles Henry,[1]	Lexington,	Theta Chi.
Jepsky, Abraham,	East Boston,	North Amherst.
Johnson, Birger Lars,	Dorchester,	29 McClellan Street.
Johnson, Sidney Clarence,[1]	Gloucester,	13 Phillips Street.
Jones, Forrest Dean,	Worcester,	116 Pleasant Street.
Jones, Harold Ellis,	New Canaan, Conn.,	Care of E. F. Gaskill.
Kennedy, Carl Francis,	Milford,	23 Amity Street.

[1] Work incomplete.

Lanphear, Marshall Olin,	Windsor, Conn.,	Kappa Sigma.
Lasker, David,[1]	Hyde Park,	31 Pleasant Street.
Lawrence, Lewis Henry,[1]	Falmouth,	83 Pleasant Street.
Lawton, Ralph Wilber,	Fall River,	75 Pleasant Street.
Levine, Darwin Solomon,[1]	Sherborn,	31 Pleasant Street.
Lipshires, David Mathew,	Roxbury,	Flint Laboratory.
Loring, William Rupert,	Great Barrington,	Physics Building.
Lyons, Louis Martin,	Rockland,	29 North Prospect Street.
Maginnis, John Joseph,[1]	Lawrence,	35 North Prospect Street.
Mallorey, Alfred Sidney,	Lynn,	15 Hallock Street.
Marshall, Max Skidmore,	Amherst,	44 Sunset Avenue.
McKee, William Henry,	Chelsea,	Theta Chi.
McNamara, Michael Joseph,[1]	Stoughton,	Stockbridge Hall.
McNaught, Warren Henry,[1]	Plymouth,	Baker Place.
McRae, Herbert Ranklin,[1]	Malden,	4 Nutting Avenue.
Messenger, Kenneth Leroy,	Winsted, Conn.,	Kappa Sigma.
Millard, Harold Baldwin,	Great Barrington,	Fitts House.
Minor, John Bacon, Jr.,[1]	New Britain, Conn.,	Kappa Sigma.
Mitchell, Edward Nahum,[1]	Medford,	Phi Sigma Kappa.
Mitchell, Theodore Bertis,	Needham,	Lambda Chi Alpha.
Mower, Carl Taft,[1]	Montpelier, Vt.,	Kappa Sigma.
Moynihan, Patrick Joseph,[1]	Holyoke,	Columbia Café.
Murrin, James Patrick,[1]	Dorchester,	Baker Place.
Newton, Edward Buckland,[1]	Holyoke,	120 Pleasant Street.
Newton, Gaylord Arthur,	Durham, Conn.,	3 Fearing Street.
Norcross, Gardner Clyde,	Brimfield,	58 Pleasant Street.
Odams, Lester Nichols,[1]	Salem,	83 Pleasant Street.
Oertel, August Leonard,[1]	South Hadley Falls,	Pleasant Street.
O'Heron, Francis James,[1]	East Milton,	5 Fearing Street.
O'Keeffe, John Philip,[1]	Millers Falls,	60 Pleasant Street.
O'Neill, Oliver Maurice,	Dorchester,	29 McClellan Street.
Patch, Lawrence Henry,	Wenham,	Plant House.
Petit, Arthur Victor,	Amherst,	31 East Pleasant Street.
Phipps, Clarence Ritchie,	Dorchester,	Theta Chi.
Popp, Edward Williams,	Albany, N. Y.,	3 McClellan Street.
Powell, James Congdon,	Newport, R. I.,	20 South College.
Pratt, Oliver Goodell,	Salem,	Kappa Sigma.
Preble, John Nelson,	Jamaica Plain,	116 Pleasant Street.
Raymond, Clinton Rufus,	Beverly,	Lambda Chi Alpha.
Reumann, Theodore Henry,	New Bedford,	87 Pleasant Street.
Richardson, Stephen Morse,	Montague,	9 South College.
Ritter, Ernest,[1]	New Britain, Conn.,	Theta Chi.
Robbins, Waldo Whiting,[1]	South Hingham,	53 Lincoln Avenue.
Roberts, Oliver Cousens,	Roxbury,	Theta Chi.
Robinson, William Herbert,	Lynn,	87 Pleasant Street.
Rosequist, Birger Reignold,[1]	Brockton,	18 Nutting Avenue.
Russell, Howard Leigh,	Worcester,	116 Pleasant Street.
Rutter, Walter Frederick,	Lawrence,	17 Fearing Street.
St. George, Raymond Alexander,[1]	Lynn,	15 Hallock Street.
Sampson, Fred Bucknam,[1]	Fall River,	60 Pleasant Street.
Sanborn, Deane Waldron,	Nantucket,	North Pleasant Street.
Sawyer, Wesley Stevens,[1]	Jamaica Plain,	Beta Kappa Phi.
Sawyer, William George,	Berlin,	7 South College.
Schlough, George Homer,[1]	Waltham,	6 Nutting Avenue.
Schwartz, Louis,[1]	Melrose,	West Experiment Station.
Seavey, Arthur Jones,[1]	New Braintree,	Theta Chi.
Sedgwick, Alfred,[1]	Fall River,	Alpha Sigma Phi.
Smith, Carleton Tower,	West Newton,	116 Pleasant Street.
Smith, Sidney Sumner,	Roslindale,	116 Pleasant Street.
Spaulding, Lewis Winans,[1]	South Hingham,	8 South College.
Spencer, Arthur Winthrop,[1]	Danvers,	North College.
Stackpole, Frank Charles,[1]	Somerville,	Lambda Chi Alpha.

[1] Work incomplete.

Stowe, Raymond Timothy,	Scitico, Conn.,	15 Hallock Street.
Stowers, Addison Clifford,	Dorchester,	15 Phillips Street.
Strong, William Perkins,[1]	South Hadley Falls,	Pine Street, North Amherst.
Sullivan, Harold Leo,	Lawrence,	7 North College.
Sutherland, Ralph,	Cambridge,	Alpha Sigma Phi.
Thompson, Wells Nash,[1]	Adams,	Alpha Sigma Phi.
Thorpe, Richard Warren,	West Medford,	15 Beston Street.
Tilton, Arthur Dana,[1]	Wellesley,	Phi Sigma Kappa.
vanAlstyne, Lewis Morrell,[1]	Kinderhook, N. Y.,	Baker Place.
Vickers, John,[1]	Amherst,	Beta Kappa Phi.
Walker, George Jones,[2]	Lexington,	– –
Weeks, Roger Wolcott,	Hyde Park,	Kappa Sigma.
Wilbur, Laurence Weston,	South Middleborough,	Beta Kappa Phi.
Willoughby, Raymond Royce,	New Britain, Conn.,	Care of E. F. Gaskill.
Wooding, Paul Bennett,[1]	Yalesville, Conn.,	M. A. C. Plant House.
Woodworth, Brooks,	Lowell,	Lincoln Avenue.
Worthley, Harlan Noyes,	Greenwood,	Flint Laboratory.
Yesair, John,[1]	Byfield,	Kappa Sigma.

Freshman Class.

Abrams, Jacob,[1]	East Boston,	North Amherst.
Alden, Dean Watson,[1]	Proctor, Vt.,	North Amherst.
Anderson, George,[1]	Somerville,	15 Beston Street.
Andrews, Milton Earle,	Hammonton, N. J.,	30 North Prospect Street.
Bailey, William,[1]	Williamstown,	North Amherst.
Baker, William Alphonso,[1]	Melrose,	66 Pleasant Street.
Baker, William Herbert, Jr.,	Chesterfield,	5 Nutting Avenue.
Bartlett, Samuel Colcord, Jr.,	Colerain,	81 Pleasant Street.
Batchelder, Stewart Putnam,	North Reading,	66 Pleasant Street.
Bath, Richard George,	West Springfield,	5 McClellan Street.
Batista, Victor,	Havana, Cuba,	79 Pleasant Street.
Beadle, Herbert Ocumpaugh,	Lima, N. Y.,	18 Nutting Avenue.
Bigelow, George Samuel,[1]	Millville, N. J.,	Lincoln Avenue.
Blanchard, Carlton Douglas,	Uxbridge,	9 Phillips Street.
Blanchard, George Kinson,	Abington,	Baker Place.
Boland, Kells Shepard,	South Boston,	9 Fearing Street.
Bond, Herbert Richard,	Dover,	Lincoln Avenue.
Bowen, Arthur Newton,[1]	Wollaston,	15 Phillips Street.
Bowen, Maurice Stetson,[1]	Lakeville,	81 Pleasant Street.
Bower, Richard,[1]	Braintree,	Baker Place.
Boyce, Alan Freeman,[1]	Melrose,	Baker Place.
Boynton, Raymond Woods,[1]	Framingham,	120 Pleasant Street.
Brigham, Paul Tracy,	Leominster,	77 Pleasant Street.
Brown, Ralph Hall,	Ayer,	17 Phillips Street.
Buffum, Eliot Mansfield,	Waban,	77 Pleasant Street.
Burt, Henry John,	West Somerville,	75 Pleasant Street.
Burton, Lee Williams,	Plainville,	58 Pleasant Street.
Callanan, John Edward,	Dorchester,	60 Pleasant Street.
Callanan, Vincent DePaul,	Malden,	4 Chestnut Street.
Campbell, Donald Lincoln,[1]	South Deerfield,	66 Pleasant Street.
Campbell, George Murray,[1]	Baltimore, Md.,	Mount Pleasant.
Carley, Harry Gray,[1]	West Newton,	Lincoln Avenue.
Carpenter, Hall Bryant,[1]	Somerville,	14 Nutting Avenue.
Carroll, Olive Evangeline,[1]	Dorchester,	Draper Hall.
Cassidy, Morton Harding,	East Boston,	3 McClellan Street.
Chadbourne, Joseph Alfred,	Great Barrington,	87 Pleasant Street.
Chandler, Arthur Lincoln,	Leominster,	77 Pleasant Street.
Chapin, Frederic Charles,	Greenfield,	15 Beston Street.
Chase, Chester Ingalls,[1]	Melrose,	17 Phillips Street.
Chase, Malcolm Willis,	Amesbury,	4 Chestnut Street.
Chisholm, Robert Dudley,	Melrose Highlands,	66 Pleasant Street.

[1] Work incomplete.

[2] Entered in February, 1915; left in June, 1915.

Clapp, Agustus Warren,	East Braintree,	Baker Place.
Clark, Francis Marsh,	Oxford,	1 Allen Street.
Coderre, Ernest Laurier,	Southbridge,	35 North Prospect Street.
Coe, Elmore Holloway,[1]	Rockfall, Conn.,	16 Nutting Avenue.
Cole, Frederick Eugene, Jr.,	South Portland, Me.,	North Amherst.
Collins, Robert Burleigh,	Rockland,	116 Pleasant Street.
Cone, Willis Refine,[1]	Mittineague,	5 McClellan Street.
Cooley, Edwin Prince,	Sunderland,	Sunderland Road.
Copeland, Raymond Norman,[1]	Hyde Park,	44 Pleasant Street.
Cosby, Alfred Francis,	Westfield,	15 Amity Street.
Crawford, Aaron Ennis,	Greenfield,	60 Pleasant Street.
Crimmin, Royce Brainerd,	Haverhill,	7 Nutting Avenue.
Crowe, Charles,	Norwich, Conn.,	Baker Place.
Davies, James Pillsbury,[1]	Cambridge,	6 Phillips Street.
Day, Elston Almond,	Northbridge,	58 Pleasant Street.
Day, Harold Ralph,[1]	Hopedale,	Baker Place.
Desmond, Thomas Whitty,[1]	Randolph,	Baker Place.
Dickinson, Victor Abel,[1]	Amherst,	Mount Pleasant.
Donigan, Henry Joseph,	Marion,	North Amherst.
Douglas, Effie Pearl,[1]	Amherst,	High Street.
Dunbar, Charles Oliver,	Westfield,	7 Allen Street.
Dunn, Leslie Burnham,[1]	Melrose Highlands,	5 Nutting Avenue.
Dwyer, James Edward,	South Deerfield,	17 Phillips Street.
Edmonds, Reginald Whitney,	Roslindale,	37 North Prospect Street.
Eilertsen, Arthur Oliver,[1]	Roslindale,	116 Pleasant Street.
Erhard, Bena Gertrude,[1]	East Milton,	Draper Hall.
Erickson, Gunnar Emmanuel,	Lynn,	North Amherst.
Evans, Myrton Files,	West Somerville,	14 Nutting Avenue.
Faneuf, Ambrose Clement,	West Warren,	Birch Lawn.
Farrington, Robert Pierce,[1]	Nantucket,	Birch Lawn.
Faxon, Paul,	West Newton,	77 Pleasant Street.
Fellows, Katharine Adelheid,	Northampton,	21 Amity Street.
Field, John Bacon,[1]	Sharon,	4 Chestnut Street.
Field, Wilbert Daniel,[1]	Somerville,	6 Nutting Avenue.
Finkelstein, Hyman,	East Boston,	– –
Fiske, Eustace Bridge,	Somerville,	75 Pleasant Street.
Fogg, Verne Allen,[1]	Topsfield,	4 Chestnut Street.
French, Willard Kyte,	Worcester,	6 Phillips Street.
Garde, Earl Augustus,	Lynn,	Pease Avenue.
Gay, Laurence Washburn,	Groton,	116 Pleasant Street.
Gilligan, Gerald Mathew,[1]	West Warren,	12 South Prospect Street.
Glavin, William Francis,	Wenham,	6 Phillips Street.
Goff, Howard Mason,	Everett,	120 Pleasant Street.
Graves, Walter Decker,[1]	Brookline,	Baker Place.
Gray, Harold Frederick,	Townsend Harbor,	5 Nutting Avenue.
Green, Lynn,	Schenevus, N. Y.,	75 Pleasant Street.
Grout, Nathan,[1]	Sherborn,	60 Pleasant Street.
Guba, Emil Frederick,[1]	New Bedford,	12 Cottage Street.
Gurshin, Melvin William,	Lynn,	35 North Prospect Street.
Hall, Frank Edwin,[1]	Rockland,	Aggie Inn.
Hamilton, Howard Milton,[1]	Winchester,	Cottage Street.
Harding, George Warren,[1]	Somerville,	14 Nutting Avenue.
Harris, Ethel Lovett,[1]	Beverly,	Draper Hall.
Hartwell, Richard Raymond,	Springfield,	Baker Place.
Haslam, Emerson Francis,	Hyde Park,	3 Nutting Avenue.
Hastings, Louis Pease,	Springfield,	Baker Place.
Hathaway, Wilfred Adelbert,	Berkley,	44 Triangle Street.
Hayes, John Anthony,	Milford,	Mount Pleasant.
Hession, William Joseph,	Somerville,	14 Nutting Avenue.
Hodgson, Benjamin Earl,	Methuen,	22 Amity Street.
Holmgren, Richard Sigfrid,	East Lynn,	15 Hallock Street.
Hopkins, George Randolph Lawrence,[1]	Orleans,	60 Pleasant Street.

[1] Work incomplete.

Howe, Ralph Thomas,	Melrose Highlands,	5 Nutting Avenue.
Howland, George Herbert,[1]	Melrose Highlands,	83 Pleasant Street.
Jewell, Charles Henry,	Merrimac,	17 Kellogg Avenue.
Johnson, Lawrence Wilhelm,	Avon,	12 Cottage Street.
Jones, Edson Temple,[1]	Roslindale,	42 McClellan Street.
Jordan, Raymond Douglas,[1]	Springfield,	21 Fearing Street.
Kelley, Kenneth Gordon,	Lynn,	— —
Kennedy, Alan Giles,[1]	Milford,	21 Amity Street.
King, William Cutting,[1]	Suffield, Conn.,	5 Sunset Avenue.
Knight, Frank Edward,	Brimfield,	58 Pleasant Street.
Kolpack, Harry William,	East Boston,	North Amherst.
Leavitt, John Woodbury,	Dorchester,	18 Nutting Avenue.
Liebman, Anna,[1]	Dorchester,	38 Cottage Street.
Lochiades, Charilaos George,[1]	Springfield,	67 Pleasant Street.
Logan, Milan Alexander,[1]	Brockton,	North Amherst.
Macdonald, Harold Ray,	Buzzards Bay,	6 Phillips Street.
Mahon, John Joseph,	New Canaan, Conn.,	Baker Place.
Mansell, Elton Jessup,	Cambridge,	15 Beston Street.
Martin, Chester Walter,[1]	Orange,	Baker Place.
Mattoon, Charles Gordon,	Pittsfield,	120 Pleasant Street.
McCarthy, Arthur Martin,[1]	Monson,	East Pleasant Street.
McGivern, Eugene Augustine,	Lynn,	44 Triangle Street.
Montgomery, Arthur Bird,	Dedham,	44 Pleasant Street.
Montgomery, Forest Kimball,	East Orange, N. J.,	Baker Place.
Moor, Erwin Charles,	Lynn,	7 Allen Street.
Moore, John Raymond,	Tolland,	Birch Lawn.
Morgan, Earl Amos,	Amherst,	2 Allen Street.
Morse, Louis Edgar, Jr.,	North Attleborough,	101 Pleasant Street.
Morton, Elmer Joshua,[1]	Waltham,	4 Chestnut Street.
Moskowitz, Maurice,	Dorchester,	31 Pleasant Street.
Munroe, Raymond Franklin,	Fall River,	77 Pleasant Street.
Newbold, Douglas Tracy,	Northampton,	Lincoln Avenue.
Newton, Raymond Lovejoy,[1]	Malden,	15 Fearing Street.
O'Hara, Joseph Ernest,[1]	Worcester,	6 Phillips Street.
Parke, Robert Warren,	Winchendon,	7 Allen Street.
Parkhurst, Raymond Thurston,	Fitchburg,	53 Lincoln Avenue.
Parsons, Edward Field,	North Amherst,	North Amherst.
Peck, George Newberry,[1]	Wilson, Conn.,	75 Pleasant Street.
Peck, Roger Eugene,	Shelburne,	5 McClellan Street.
Peirson, Henry Byron,	Haverhill,	7 Nutting Avenue.
Perry, Errol Clinton,[1]	Acushnet,	15 Hallock Street.
Peterson, Leroy Duane,	Greenfield,	44 Triangle Street.
Phemister, Robert Grey,	Providence, R. I.,	15 Phillips Street.
Pierpont, Frederick Trowbridge,	Chester, Pa.,	7 Nutting Avenue.
Platt, William Sherman,	Leominster,	7 Nutting Avenue.
Pond, Allan Leon,	Holliston,	15 Phillips Street.
Poole, Harold Walter,	Hudson,	96 Pleasant Street.
Prée, Karl Julius,	Brookline,	81 Pleasant Street.
Pulley, Marion Gertrude,	Melrose,	2 Allen Street.
Quimby, Arthur Edmund,	Somerville,	36 North Prospect Street.
Rea, Julian Stuart,[1]	Weymouth,	Lincoln Avenue.
Readio, Roger Frank,	Florence,	120 Pleasant Street.
Rice, Harold Miller,	Kensington, Conn.,	3 McClellan Street.
Roberts, Mark Anthony,[1]	Dorchester,	17 Phillips Street.
Ross, Donald,	Arlington,	15 Beston Street.
Rowe, Clifford Alton,[1]	East Orange, N. J.,	81 Pleasant Street.
Sampson, George Austin,[1]	Allston,	15 Phillips Street.
Sargent, Walter Harriman,	Malden,	4 Chestnut Street.
Schenkelberger, Frederic,[1]	Quincy,	Aggie Inn.
Seavey, Paul Stanley,[1]	Cambridge,	17 Fearing Street.
Sexton, Ernest Francis,	Darien, Conn.,	Baker Place.
Sheldon, Howard Rhoades,	New Marlborough,	4 Chestnut Street.

[1] Work incomplete.

Sibley, Helen Aramintha,	Longmeadow,	Draper Hall.
Skinner, Everett Hamilton,[1]	West Upton,	Baker Place.
Smallwood, John Henry,	Paterson, N. J.,	3 Nutting Avenue.
Smith, Jonathan Harold,	Roslindale,	116 Pleasant Street.
Smith, Wendell Frederick,[1]	Troy, N. Y.,	75 Pleasant Street.
Snow, Palmer Prince,	Barnstable,	North Amherst.
Spaulding, Harold Edwin,[1]	Milford,	Baker Place.
Sproul, Walton Dyer,	Norwell,	29 North Prospect Street.
Stafford, Irving Boynton,	Fall River,	75 Pleasant Street.
Stearns, Horace David,	Waltham,	3 McClellan Street.
Stevens, Chester Dillingham,	Reading,	66 Pleasant Street.
Stockbridge, John Sylvester,	Atlanta, Ga.,	Farview Way.
Stockwell, Erwin Sidney, Jr.,	Sharon,	81 Pleasant Street.
Strack, Edward,	Framingham,	Clark Hall.
Stuart, Vincent Cyril,	Newton,	Aggie Inn.
Sweeney, William Joseph,[1]	Dorchester,	Hillside Avenue.
Swift, Hubbard,	West Falmouth,	10 South College.
Taylor, Edmund Billings,[1]	Wollaston,	81 Pleasant Street.
Thayer, Julian Bailey,	Durham Center, Conn.,	36 North Prospect Street.
Thayer, Weston Cushing,	Hingham,	53 Lincoln Avenue.
Thomas, Daniel Joseph,[1]	Turners Falls,	36 North Prospect Street.
Thomas, Frank DesAutel,[1]	Milford,	Mount Pleasant.
Tietz, Harrison,	Richmond Hill, N. Y.,	Brooks Farm.
Tirrell, Loring Vinson,[1]	South Weymouth,	16 Nutting Avenue.
Waite, Richard Austin,	Middlefield,	17 Phillips Street.
Wells, Marion Nichols,	Springfield,	Draper Hall.
Wheeler, Russell Hubbell,	Newtown, Conn.,	M. A. C. Farm House.
White, Edward Asa,	Providence, R. I.,	North Pleasant Street.
White, George Lansford,[1]	Great Barrington,	87 Pleasant Street.
Whittle, Clarence Parker, Jr.,	Weymouth,	16 Nutting Avenue.
Wilder, Charles Henry,	Springfield,	21 Fearing Street.
Williams, Allan Carruth,	Rockland,	29 North Prospect Street.
Williams, Kenneth Sanderson,	Sunderland,	17 Phillips Street.
Willis, Howard Curtis,[1]	Amherst,	13 Cottage Street.
Window, James Joseph,	Lynn,	7 Allen Street.
Window, Thomas,[1]	Lynn,	7 Allen Street.
Wing, Arland Junius,	Danvers,	12 Cottage Street.
Wiswell, Ray Herbert,	Northampton,	66 Pleasant Street.
Wood, Ernest Perry,	Mendon,	7 Phillips Street.
Wood, Oliver Wiswell,	Arlington,	81 Pleasant Street.
Woodard, Chester Smith,	Leverett,	Leverett.
Woodbury, Ray Willard,	Newburyport,	Cottage Street.
Woods, Frank Archibald,	Groton,	83 Pleasant Street.
Woodside, Wilfred Livingstone,[1]	Auburndale,	4 Chestnut Street.
Wright, John Lindsey,[1]	Putnam, Conn.,	Kappa Sigma.
Wright, Livingstone,[1]	Quincy,	4 Chestnut Street.

Unclassified Students.

Allen, Arthur Frederic,	Cambridge,	Prospect House.
Avery, Humphrey Roger,	Patchogue, N. Y.,	77 Pleasant Street.
Berry, Fred Mitchell,	Lynnfield Center,	120 Pleasant Street.
Bridgman, Ralph Scofield,	Westhampton,	60 Pleasant Street.
Campbell, John Collins,	Gardner,	Baker Place.
Churchill, Chester Albert,	Brockton,	18 Nutting Avenue.
Clancy, Henry Gregory,	Natick,	Baker Place.
Crane, Arthur Francis,	North Hanover,	24 Beston Street.
Cross, Robert Earle,	Agawam,	21 Fearing Street.
Derby, Llewellyn Light,[1]	Hudson,	Baker Place.
Emerson, Caroline Dwight,	Amherst,	21 Northampton Road.
Gamage, Carl Everett,	Lynn,	– –
Grundler, Adolph Joseph,	Lowell,	120 Pleasant Street.

[1] Work incomplete.

Gustafson, Helmar Gustaf,	Springfield,	18 Hallock Street.
Hill, Donald Russell,	Arlington,	29 McClellan Street.
Jones, Percival,	Cambridge,	Mount Pleasant.
Kidder, Addison Richard,	Wardsboro, Vt.,	3 McClure Street.
Leary, Frank Dennis,	Brockton,	12 Cottage Street.
McLean, George Robert,[1]	Northampton,	60 Washington Avenue, Northampton.
McManus, Mark Augustine,	Lawrence,	101 Pleasant Street.
Morse, Louis Lincoln,	Dorchester,	7 Allen Street.
Norris, Harold Allison,	Amherst,	North Amherst.
Phillips, Everett Daniel,	Brookline,	101 Pleasant Street.
Spaulding, Lyford Pingree,	Lexington,	77 Pleasant Street.
Stebbins, Blanchard,	Newton,	– –

Summary by Classes.

Graduate students,	52
Senior class,	108
Junior class,	110
Sophomore class,	162
Freshman class,	211
Unclassified students,	25
Total registration,	668

Geographical Summary.

Massachusetts,	564
Connecticut,	30
New York,	21
New Jersey,	14
Pennsylvania,	6
Maine,	5
Vermont,	5
Rhode Island,	4
New Hampshire,	3
Canada,	2
California,	1
Cuba,	1
Georgia,	1
India,	1
Indiana,	1
Japan,	1
Kansas,	1
Maryland,	1
Missouri,	1
Ohio,	1
Oklahoma,	1
Oregon,	1
Virginia,	1
Wyoming,	1
Total,	668

[1] Work incomplete.

Short Course Students, 1915.

The Ten Weeks' Course.

Adams, Chas. J.,	Arlington.
Aldrich, Leon H.,	Northampton.
Allen, E. B.,	Stockbridge.
Anderson, Mrs. Ernest,	Amherst.
Atkins, Horace K.,	Pleasant Lake.
Bacon, Ralph D.,	Auburn.
Baker, Philip E.,	Norwood.
Barker, Arthur R.,	Littleton.
Barnes, Blakeslee H.,	Yalesville, Conn.
Barnes, James P.,	Yalesville, Conn.
Bates, Fred A.,	Huntington.
Bates, Stacy C.,	Concord Junction.
Bemis, Roger E.,	Spencer.
Bowles, Howard J.,	Springfield.
Bradshaw, Forrest D.,	South Framingham.
Bridgmam, Federal B.,	Westhampton.
Briggs, Harry G.,	Beverly.
Briggs, Leslie W.,	Fitchburg.
Brooks, George R.,	North Grafton.
Brooks, Ida L.,	Worcester.
Brooks, Roger E.,	Worcester.
Buckland, Frederick,	Watertown.
Buckley, W. A.,	Townsend Harbor.
Carr, Ralph W.,	Ashby.
Chapman, E. A.,	Montgomery.
Childs, Stewart I.,	Sunderland.
Clark, Ernest S., Jr.,	Sutton.
Clark, Leonard T.,	Wethersfield, Conn.
Clark, Roderick A.,	Florence.
Clark, William Hobart,	Danvers.
Clary, J. A.,	Conway.
Clem, Katharine L.,	Brooklyn, N. Y.
Colitas, George,	Waltham.
Comstock, Clark P.,	Housatonic.
Coristine, Mrs. Mary S.,	Lee.
Coristine, Walter,	Lee.
Corson, Earl L.,	Okeana, O.
Cox, Fannie A.,	Hyde Park.
Dalrymple, George S.,	Plainfield.
Dana, Alfred L.,	Great Neck, Long Island, N. Y.
Davison, L. B.,	Danby, Vt.
Demirjian, Moses N.,	Bridgewater.
Dorling, Herbert,	Spencer.
Dorsey, John E., Jr.,	North Amherst.
Downs, Winnifred D.,	Springfield.
Dragon, Frank W.,	Northampton.
Drummond, Joseph L.,	Amherst.
Ebersbach, Fador,	Lawrence.
Edwards, Harold,	Dunham, Province of Quebec, Can.
Eldred, George E.,	Bennington, Vt.

Ellis, Charles H.,	Boston.
Ely, Ralph A.,	Holyoke.
Fargo, Frank,	Conway.
Flagg, Maurice,	Littleton Common.
Gala, Andrew,	Greenwich, Conn.
Galligan, Clarence,	New Haven, Conn.
Gardner, Shirley E.,	Pittsfield.
Garrett, Jackson R.,	Concord.
Gaylord, F. B.,	Northampton.
Gee, Harold W.,	Springfield.
Gee, Mrs. Harold W.,	Springfield.
Goff, Henry H.,	Fall River.
Goff, Winslow H.,	Grafton.
Gushee, Almond E.,	Dorchester.
Hall, Louis C.,	Wallingford, Conn.
Hallberg, Carl A.,	Peabody.
Hames, Lawrence B.,	Springfield.
Hamlin, Benj. P.,	Amherst.
Hamlin, Margaret R. P.,	Amherst.
Hammond, Burton N.,	Onset.
Hammond, Charles W.,	Rossville, N. Y.
Hancock, Mrs. Alice H.,	Hyde Park.
Hanley, James F.,	Concord.
Harmount, Dwight Hunt,	Branford, Conn.
Harrington, Ellis T.,	Paxton.
Hopkinson, Harry B.,	Cambridge.
Hubbard, D. B., Jr.,	Middletown, Conn.
Jaspers, Richard,	New Haven, Conn.
Johnson, George L., Jr.,	Pittsfield.
Johnson, Walter C.,	Springfield.
Jones, Mrs. E. A.,	Honolulu, Hawaii.
Kennedy, Florence E.,	New Haven, Conn.
Kennedy, Marguerite I.,	New Haven, Conn.
Keyes, F. G.,	Worcester.
Kimball, Elizabeth,	Arlington.
King, Arthur E.,	Sutton.
Kingman, Robert W.,	Somerville.
Lancy, Benj. C.,	Halifax.
Law, W. P., Jr.,	Lynnfield.
Lee, Margaret D.,	Northampton.
Leonard, William J.,	Ashuelot, N. H.
Levenson, Samuel,	Holyoke.
Livers, Susie D.,	Arlington Heights.
Luther, C. Raymond,	Millbury.
Lyman, Clarence S.,	Gilbertville.
Lyman, F. Brainard,	Grafton.
McConnell, Ralph,	Somerville.
McCray, Carlos,	Monson.
MacDonald, Wm. H.,	Forest Hills.
McKinstry, Joseph H.,	Auburn.
McKirahan, J. E.,	East Ryegate, Vt.
MacLeod, Roderick A.,	Northampton.
Mace, Albert E.,	Wilbraham.
Manning, Charles H.,	Pittsfield.
Marsh, John E.,	Melrose Highlands.
Mathews, L. R.,	Springfield.
Maxwell, Harry,	Elmwood, N. H.
Miller, Donald H.,	Whitman.
Mills, Chester A.,	Pepperell.
Minigan, Everett H.,	Sterling Junction.
Mitchell, Robert A.,	Danvers.
Montgomery, G. Milton, Jr.,	Windsor Locks, Conn.
Moore, Elizabeth F.,	Washington, D. C.
Mosher, Jay M.,	North Attleborough.

Mosher, Samuel M.,	Lakeville.
Nason, Charles A.,	Boston.
Newton, R. L.,	Malden.
Nims, Roger E.,	Montague.
Northrop, Marvin E.,	Three-Mile Bay, N. Y.
Noyes, Walter O.,	Newburyport.
Ogawa, Wasaburo,	Milton.
Ohlson, Carl,	Pittsfield.
Oliver, Wendell F.,	Lynn.
Osgood, John B.,	Orange.
Osgood, Mrs. John B.,	Orange.
O'Toole, Patrick B.,	Waltham.
Owen, Elmer G.,	Paxton.
Parker, Ervine F.,	Poquonock.
Parker, George E.,	East Lynn.
Parsons, Earl M.,	Northampton.
Peck, Fred S.,	South Dayton, N. Y.
Perry, Norman,	Sutton.
Pierce, Harry W.,	Amherst.
Potter, Edward K.,	New Haven, Conn.
Poulin, Alexander, Jr.,	South Lancaster.
Pratt, Walter H.,	Dalton.
Priest, Mrs. Lucia M.,	Allston.
Prior, Leon C.,	Plympton.
Prouty, Ellis F.,	Amherst.
Randall, Alvin R.,	Agawam.
Rhodes, George,	Canaan, Conn.
Richardson, Leroy M.,	Winchester.
Roberts, Ivan A.,	South Lee.
Robinson, John,	Oakham.
Rogers, Helen,	Rochester.
Russell, Edward S.,	Amherst.
Russell, Perley E.,	St. Johnsbury, Vt.
Sanborn, Arthur H.,	Winter Hill.
Sanborn, Ruby,	Beverly.
Schweitzer, Walter,	Jamaica Plain.
Scofield, Ralsey B.,	Greenwich, Conn.
Senter, Everett E.,	Clinton.
Shattuck, George A.,	East Pepperell.
Skinner, Russell,	Brimfield.
Smith, Harry A.,	Bolton.
Smith, Harry A.,	Amherst.
Smith, Walter B.,	West Chesterfield.
Stark, Joseph F.,	West Brattleboro, Vt.
Stickney, F. H.,	Worcester.
Stocking, Charles P.,	Williamstown.
Stockwell, Wm. T.,	Sutton.
Stone, Frederick T.,	Chelsea.
Stone, Robert D.,	Worthington.
Stoughton, Philip,	Montague.
Stowell, A. L.,	Springfield.
Thomas, O. D.,	Brockton.
Tower, Harold M.,	Becket.
True, Fred L.,	Salisbury.
Trumbull, Lymont A.,	Worcester.
Tucker, Henry G.,	Avon.
Tucker, Mrs. Ruth B.,	Avon.
Tufts, James Arthur, Jr.,	Concord.
Turoff, Henry,	Attleboro.
Walpuski, Theodore G., Jr.,	New York City.
Warland, W. S.,	Cambridge.
White, Donald,	Wakefield.
White, Gertrude M.,	Hartford, Conn.
White, Henrique R. F.,	New York City.

Willard, Harold N.,	Roland Park, Md.
Williams, Raymond F.,	Holyoke.
Willis, Nelson B.,	Upton.
Wilson, William A.,	South Hadley.

Summer School of Agriculture and Country Life.

Adams, Ruth A.,	Worcester.
Allanbrook, Mabel C.,	Wilmington.
Armstrong, Mary F.,	West Springfield.
Arnold, John B.,	Tarrytown, N. Y.
Arnold, Mrs. John B.,	Tarrytown, N. Y.
Ayer, Addie M.,	Richford, Vt.
Bailey, Laura H.,	East Saugus.
Bales, Mrs. Harold C.,	North Amherst.
Bau, Mingchie J.,	China.
Bauman, Lucian,	Holyoke.
Bellamy, Mrs. John,	Dorchester.
Bernhardt, Laura,	Harvard.
Beytes, Marion W.,	North Plymouth.
Bleeker, Alethea S.,	Methuen.
Bottume, Hazel E.,	Windsor Locks, Conn.
Brewer, Cyrus,	Scituate.
Brewer, Mrs. Cyrus,	Scituate.
Broad, Gertrude F.,	Gloucester.
Bryant, Bertha W.,	Woburn.
Buckley, Ethel L.,	Needham.
Burk, Emma L.,	Philadelphia, Pa.
Burnap, Margaret,	Woburn.
Burt, Helen F.,	West Somerville.
Carlisle, Edward S.,	Malden.
Carlton, Louise E.,	Williamstown.
Carver, Katharine H.,	Meriden, Conn.
Cassini, Mrs. E.,	Boston.
Chapin, Jennie E.,	Richmond Hill, N. Y.
Cheiffets, Louia,	Worcester.
Chen, H. C.,	Baltimore, Md.
Clark, Frank Y.,	Newton Center.
Clark, W. B.,	Williamstown.
Clarkson, Margaret M.,	Fall River.
Cotton, Edith F.,	Malden.
Cummings, Mary F.,	Boston.
Davis, Ruth A.,	Winter Hill.
Day, Mrs. Clara S.,	New York City.
Demond, Grace E.,	Chicopee Falls.
Denslow, Raymond A.,	Berwyn, Ill.
Doran, Cecilia M.,	Fall River.
Dresser, Henrietta M.,	Haverhill.
Dudley, Sarah A.,	Wollaston.
Dunné, Charles B.,	Brooklyn, N. Y.
Durkee, Dorothy B.,	Worcester.
Eastman, Frances M.,	Amherst.
Edmonds, Mary J.,	Billerica.
Elliot, John,	Groton.
Elliott, S. Maria,	Boston.
Elwell, Susan W.,	Danvers.
Espinosa, Eloisa,	Boston.
Everitt, Mary S.,	Amherst.
Fick, Mrs. H. L. A.,	New York City.
Field, Florence E.,	Gardner.
Flaherty, Marguerite A.,	Hadley.
French, Alice M.,	Lowell.
Frye, Grace E.,	Billerica.
Gaiser, Frederic R.,	New York City.

Gaskill, Marie W.,	Hopedale.
Gavin, Gertrude L.,	Roxbury.
Gavin, Madeline R.,	Roxbury.
Goodnow, Gladys B.,	Fairhaven.
Gray, Isabelle M.,	Somerville.
Grundler, A. J.,	Lowell.
Hall, Mrs. N. L.,	Boston.
Hamilton, Easter I.,	Worcester.
Hardy, Fred C.,	Lancaster.
Harris, Edna M.,	Meriden, Conn.
Helburn, Theresa,	Housatonic.
Henry, Margaret L.,	Norwalk, Conn.
Hobbs, Mary E.,	Fall River.
Hodsdon, Villa,	Cambridge.
Honnay, Agnes,	Amherst.
Hoyt, Minnetta,	East Saugus.
Hoyt, Mrs. Laura A.,	Greenfield.
Hubbard, Alice W.,	Weston.
Hubbard, Olive,	Amherst.
Jackson, Helen,	Brookline.
Jacobs, Adeline H.,	Philadelphia, Pa.
Johns, Lois,	Amherst.
Junkins, Roland,	Eliot, Me.
Kattelle, Fannie M.,	Melrose.
Kebler, Mary W.,	Cincinnati, O.
Keith, Lucy E.,	Gardner.
Kingman, Ruth E.,	Somerville.
Klein, Alice L.,	Thompsonville, Conn.
Laing, Minerva A.,	Granville, N. Y.
Lance, Eva E.,	South Meriden, Conn.
Levin, Ethel H.,	Amherst.
Lewis, Alice,	Meriden, Conn.
Li, K. H.,	China.
Litch, John H.,	New London, N. H.
Ludwig, Irving F.,	Jamaica Plain.
Lyman, Ruth,	North Adams.
McHugh, Ellen,	Boston.
Mandeville, Ernest,	Holyoke.
Mandley, Ethel L.,	New Bedford.
Mason, Isadore H.,	Gardner.
Mathews, Maude A.,	Fall River.
Matson, Nathalie,	Brooklyn, N. Y.
Mellen, Adele L.,	Cambridge.
Mellen, Edwin D.,	Cambridge.
Mellen, J. Edwin,	Cambridge.
Mellen, Lucile C.,	Cambridge.
Mellen, Richard A.,	Cambridge.
Menard, Leon J.,	Holyoke.
Merrill, Earle D.,	Lewiston, Me.
Mitchell, Edw. A.,	Cappahosic, Va.
Monk, Anna C.,	Stoughton.
Morrill, Frances,	Worcester.
Morris, I. Margaret,	Jenkintown, Pa.
Neal, Marie J.,	Pittsfield.
O'Brien, William S.,	Worcester.
Phelon, Lucy M.,	Springfield.
Phillips, Ethel M.,	West Somerville.
Poinier, Helen,	Newark, N. J.
Price, M.,	New York, N. Y.
Putnam, Anna A.,	Worcester.
Rich, Aquila B.,	Maynard.
Ripley, Lena B.,	Belchertown.
Robinson, Mary B.,	Waltham.
Robson, Bertha V.,	Newtonville.

Rome, Edythe,	Worcester.
Rome, Esther,	Gardner.
Rome, Sophie,	Worcester.
Roop, Ruth L.,	Arlington Heights.
Ruggli, Clara W.,	Cambridge.
Ryan, Bridget A.,	Sunderland.
Sanford, Mrs. Alice P.,	Newark, N. J.
Sanford, Molly E.,	Plainfield.
Sawyer, John H.,	North Brookfield.
Schiefner, Frank H.,	Newton Center.
Schindhelm, Sabine C.,	Brooklyn, N. Y.
Sheridan, Anna K.,	Needham.
Sheridan, Mrs. G. F.,	Winchester.
Sheridan, Kathleen,	Winchester.
Short, George T.,	Springfield.
Smith, Edith L.,	Woburn.
Smith, M. Jeannette,	Woburn.
Spencer, Mary W.,	Northampton.
Stebbins, Blanche,	Lexington.
Taylor, Miss Joe,	North Marshfield.
Terry, Julia S.,	Plainfield.
Tranter, Mrs. Lelia E.,	Ware.
Tufts, Frances W.,	New Braintree.
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Turner, George W.,	Roxbury.
Vance, O. F.,	Shelburne, Vt.
Van Sickle, Schuyler,	Springfield.
Walton, Mrs. F. J.,	Cambridge.
Warren, M. Eva,	Auburndale.
Waterman, Edith G.,	Lowell.
Webb, Bessie E.,	Billerica Center.
Webb, Helen M.,	Billerica Center.
Welch, Elizabeth B.,	Fall River.
Wells, Katherine,	Malden.
Wheeler, Ethel M.,	Bridgeport, Conn.
White, Catharine,	Amherst.
White, Helena,	Amherst.
Winchester, Rena,	Shelburne Falls.
Winslow, Edna M.,	Meriden, Conn.
Young, Edwin B.,	Hinsdale, N. H.
Yost, Emma L.,	Meriden, Conn.

School for Rural Social Service.

Anderson, M. T.,	Chesterfield.
Armitage, Frank G.,	Hampden.
Cary, George E.,	Holden.
Crane, Eleanor R. (Mrs.),	Richmond.
Crane, William M.,	Richmond.
Giles, Mrs. L. M.,	Westminster.
Hamlin, Wm. R.,	Hyde Park, Vt.
Hooper, Elisha,	Charlemont.
Hubbard, Horace R.,	Hubbardston.
Ives, Henry S.,	Westhampton.
Mayer-Oakes, S. R.,	Hadley.
Sibley, Horace A.,	Wendell.
Skilton, Emily M.,	Lowell.
Smith, Laura C.,	Berlin, Conn.

School for Library Workers.

Abbott, Mrs. J. T.,	North Wilbraham.
Adriance, Mrs. Carrie E.,	Amherst.
Barber, Edith L.,	Athol.

Berard, Margaret A.,	Turners Falls.
Booth, Mrs. Lucy A.,	Longmeadow.
Capen, Arthur G.,	Worthington.
Chapman, Inez E.,	Amherst.
Collins, Angela W.,	Rockland.
Conway, Ruth E.,	Cleveland, O.
Cooper, Miss,	Greenfield.
Drury, Charlotte H.,	Rutland.
Dunn, Mrs. Jane C.,	Ludlow.
Hastings, Mrs. A. B.,	Warwick.
Hill, Miss,	Greenfield.
Hill, Myra A.,	Williamsburg.
Hord, Dorothy E.,	Turners Falls.
Kellogg, Mary E.,	Granby.
Kingsley, M. Edna,	Monroe Bridge.
Lyman, Ethel L.,	Northampton.
McLauthlen, Mrs. J. F.,	Kingston.
Paige, Fannie S.,	Billerica.
Partenheimer, Louise S.,	Turners Falls.
Robinson, Harriet E.,	Ipswich.
Smith, Mrs. F. H.,	Hadley.
Smith, K. W.,	Middlefield.

Apple Packing School.

Backus, Victor T.,	North Marshfield.
Bowen, Everett A.,	Lakeville.
Chandler, John,	Sterling Junction.
Cogswell, W. Cleveland,	North Scituate.
Elvidge, Avery J.,	North Grafton.
Fenn, Donald F.,	Cambridge.
Foster, Charles H.,	North Andover.
Hall, Fred Porter,	Danvers.
Hitchcock, Charles F.,	Gilbertville.
Kellett, Wilfred L.,	Hopkinton.
Kinney, Frank D.,	Worcester.
Middleton, Frederick H.,	Amherst.
Nelson, Paul G.,	West Newbury.
Patten, Mrs. Robert G.,	Amesbury.
Richardson, Leroy M.,	Winchester.
Tuttle, Donald,	Reading.
Tyler, E. Warren,	Athol.
Walker, Henry P.,	Hudson.
West, Louis J.,	Waterboro, Me.

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CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE, 1916-1917.

FIFTY-FOURTH ANNUAL REPORT.

PART II.

BOSTON:

WRIGHT & POTTER PRINTING CO., STATE PRINTERS,

32 DERNE STREET.

1917.

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1916–1917.



BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1917.

Publication of this Document
approved by the
Supervisor of Administration.

The Commonwealth of Massachusetts.

Massachusetts Agricultural College,
Amherst, Dec. 1, 1916.

To His Excellency Samuel W. McCall.

Sir: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part II. of the fifty-fourth annual report of the trustees, this being the catalogue of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
President.

The Massachusetts Agricultural College.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow. When deemed necessary, additional announcements are made in a supplementary bulletin, published in the spring.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue. Special publication will be made should it become necessary on account of important changes.

CALENDAR.

1917-18.

REGULAR COURSES.

1917.

January 2, 7.30 A.M.,	Winter term begins; chapel.
February 22, Thursday afternoon,	Half holiday, Washington's Birthday.
March 23, Friday, 5 P.M.,	Winter term ends.
April 2, Monday, 12.40 P.M.,	Spring term begins; chapel.
April 19, Thursday afternoon,	Half holiday, Patriots' Day.
May 30, Wednesday,	Holiday, Memorial Day.
June 23–27, Saturday–Wednesday,	Commencement.
June 27, Wednesday,	Spring term ends.
June 28–30, Thursday–Saturday,	Entrance examinations.
July 2, Monday,	Summer term begins.
September 14, Friday,	Summer term ends.
September 12–15, Wednesday–Saturday,	Entrance examinations.
September 19, Wednesday, 1.30 P.M.,	Fall term begins; chapel.
October 12, Friday afternoon,	Half holiday, Columbus Day.
November 28, Wednesday, 12 M.–Friday, November 30, 1 P.M.,	Thanksgiving recess.
December 21, Friday, 5 P.M.,	Fall term ends.
December 31, Monday, 12.40 P.M.,	Winter term begins; chapel.

1918.

February 22, Friday afternoon,	Half holiday, Washington's Birthday.
March 22, Friday, 5 P.M.,	Winter term ends.
April 1, Monday, 12.40 P.M.,	Spring term begins; chapel.
April 19, Friday afternoon,	Half holiday, Patriot's Day.
May 30, Thursday,	Holiday, Memorial Day.
June 22–26, Saturday–Wednesday,	Commencement.
June 26, Wednesday,	Spring term ends.
June 27–29, Thursday–Saturday,	Entrance examinations.
July 1, Monday,	Summer term begins.
September 18–21, Wednesday–Saturday,	Entrance examinations.
September 20, Friday,	Summer term ends.
September 25, Wednesday, 1.30 P.M.,	Fall term begins; chapel.

Massachusetts Agricultural College.

History. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of nearly all the buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the Federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the Federal station, and subsequently the whole was incorporated with the college.

Courses. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-year[1] course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science, doctor of philosophy and master of agriculture. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and summer school. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, educational exhibits, lecture courses, demonstrations and circulating libraries.

Purpose of the College. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural col-

[1] Twenty-seven teaching departments offer instruction in agriculture, horticulture, sciences, the humanities and rural social science. A system of major courses permits a student to elect major work in 1 of 17 departments, specializing in that and allied subjects for a period of two years.

leges and high schools, for scientific experts in chemistry, entomology, botany and microbiology and for business operations having connection with practical agriculture.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, botany and zoölogy, are an essential preparation. Still other students find the course a desirable education, without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which a major course is offered.

Location and Equipment. — The agricultural college is located in the town of Amherst. The grounds comprise more than 600 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

The Massachusetts Agricultural Experiment Station.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was then without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college, and was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about one-half of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to a committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, experimentation and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

THE CORPORATION.

ORGANIZATION OF 1917.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
CHARLES H. PRESTON of Danvers,	1918
FRANK A. HOSMER of Amherst,	1918
DAVIS R. DEWEY of Cambridge,	1919
JOHN F. GANNON of Worcester,	1919
ARTHUR G. POLLARD of Lowell,	1920
GEORGE H. ELLIS of West Newton,	1920
ELMER D. HOWE of Marlborough,	1921
EDMUND MORTIMER of Grafton,	1921
NATHANIEL I. BOWDITCH of Framingham,	1922
WILLIAM WHEELER of Concord,	1922
CHARLES A. GLEASON of New Braintree,	1923
JAMES F. BACON of Boston,	1923
FRANK GERRETT of Greenfield,	1924
HAROLD L. FROST of Arlington,	1924

MEMBERS EX OFFICIO.

His Excellency Governor SAMUEL W. MCCALL, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
PAYSON SMITH, *State Commissioner of Education.*
WILFRID WHEELER, *Secretary of the State Board of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor SAMUEL W. MCCALL of Boston, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
WILFRID WHEELER of Concord, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

STANDING COMMITTEES OF THE CORPORATION.[1]

Committee on Finance.

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
FRANK A. HOSMER.
EDMUND MORTIMER.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, *Chairman.*
FRANK A. HOSMER.
ELMER D. HOWE.
PAYSON SMITH.
DAVIS R. DEWEY.
JOHN F. GANNON.
JAMES F. BACON.

Committee on Farm.

NATHANIEL I. BOWDITCH, *Chairman.*
FRANK GERRETT.
GEORGE H. ELLIS.
EDMUND MORTIMER.

[1] The president of the college is ex-officio member of each standing committee.

Committee on Horticulture.

HAROLD L. FROST, *Chairman.*
CHARLES A. GLEASON.
ELMER D. HOWE.
WILFRID WHEELER.

Committee on Experiment Department.[1]

CHARLES H. PRESTON, *Chairman.*
WILFRID WHEELER.
ARTHUR G. POLLARD.
HAROLD L. FROST.
EDMUND MORTIMER.

Committee on Buildings and Arrangement of Grounds.

FRANK GERRETT, *Chairman.*
WILLIAM WHEELER.
CHARLES H. PRESTON.
GEORGE H. ELLIS.
JAMES F. BACON.

Committee on Extension Service.

ELMER D. HOWE, *Chairman.*
GEORGE H. ELLIS.
HAROLD L. FROST.
DAVIS R. DEWEY.
WILFRID WHEELER.
JOHN F. GANNON.

Examining Committee of Overseers from the State Board of Agriculture.

JOHN BURSLEY of West Barnstable.
FRANK P. NEWKIRK of Easthampton.
WILLIAM E. PATRICK of Warren.
JOHN J. ERWIN of Wayland.
CHARLES W. FREEHAN of Great Barrington.

[1] The director of the experiment station is a member of the committee on experiment department, without vote.

Officers of the Institution.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the College, not upon seniority of appointment to the position now held.]

THE FACULTY.

Kenyon L. Butterfield, A.M., LL.D., ... President's House.
President of the College and Head of Division of Rural Social Science.

Charles H. Fernald, Ph.D., ... 3 Hallock Street.
Honorary Director of the Graduate School.

Edward M. Lewis, A.M., ... 19 Lincoln Avenue.
Dean of the College and Professor of Languages and Literature.

Fred C. Kenney, ... Mount Pleasant.
Treasurer of the College.

William P. Brooks, Ph.D., ... 6 Farview Way.
Director of the Experiment Station and Lecturer on Soil Fertility.

William D. Hurd, M.Agr., ... 46 Amity Street.
Director of the Extension Service and Supervisor of Short Courses.

Charles E. Marshall, Ph.D., ... 44 Sunset Avenue.
Director of the Graduate School and Professor of Microbiology.

Frank A. Waugh, M.Sc., ... Campus.
Head of Division of Horticulture and Professor of Landscape Gardening.

James A. Foord,[1] M.Sc.Agr., ... 54 Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Administration.

Robert J. Sprague, Ph.D., ... Mount Pleasant.
Head of Division of Humanities and Professor of Economics and Sociology.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Goessmann Professor of Chemistry.

Charles Wellington, Ph.D., ... 34 Amity Street.
Professor of Chemistry.

James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science.

Philip B. Hasbrouck, B.Sc., ... 130 Pleasant Street.
Registrar of the College and Professor of Physics.

John E. Ostrander, A.M., C.E., ... 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Professor of Entomology, Chairman of Division of Science.

A. Vincent Osmun, M.Sc., ... 5 Kendrick Place.
Professor of Botany.

William R. Hart, A.M., LL.B., ... 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears,[2] M.Sc., ... Mount Pleasant.
Professor of Pomology.

William P. B. Lockwood, M.Sc., ... 34 North Prospect Street.
Professor of Dairying.

Alexander E. Cance, Ph.D., ... 9 Fearing Street.
Professor of Agricultural Economics.

[1] On leave, Jan. 15, 1917–Jan. 14, 1918.

[2] On leave, first term, 1916–17.

JOSEPH S. CHAMBERLAIN, Ph.D., ... Mount Pleasant.
Professor of Organic and Agricultural Chemistry.
JOHN C. GRAHAM, B.Sc.Agr., ... Lincoln Avenue.
Professor of Poultry Husbandry.
G. CHESTER CRAMPTON, Ph.D., ... 10 Allen Street.
Professor of Insect Morphology.
CHARLES A. PETERS, Ph.D., ... 2 Sunset Avenue.
Professor of Inorganic and Soil Chemistry.
CURRY S. HICKS, B.Pd., ... 8 Allen Street.
Professor of Physical Education and Hygiene.
WILLIAM D. CLARK, A.B., M.F., ... 3 Mount Pleasant.
Professor of Forestry.
ERNEST ANDERSON, Ph.D., ... 3 Phillips Street.
Professor of General and Physical Chemistry.
CHRISTIAN I. GUNNESS, B.Sc., ... 105 Butterfield Road.
Professor of Rural Engineering.
HENRY W. FLEET, Captain, U. S. A., ... 5 Phillips Street.
Professor of Military Science and Tactics.
HAROLD F. TOMPSON, B.Sc., ... 10 Temple Street, Arlington.
Professor of Market Gardening.
JOHN PHELAN, A.M., ... 29 Northampton Road.
Professor of Rural Sociology.
JOHN C. MCNUTT, B.Sc.Agr., ... 33 East Pleasant Street.
Professor of Animal Husbandry.
CLARENCE E. GORDON, Ph.D., ... 38 Lincoln Avenue.
Associate Professor of Zoölogy and Geology.
ROBERT W. NEAL, A.M., ... 15 Spring Street.
Associate Professor of English.
EDGAR L. ASHLEY, A.M., ... 24 Pleasant Street.
Associate Professor of German.
ALEXANDER A. MACKIMMIE, A.M., ... Pine Street, North Amherst.
Associate Professor of French.
BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Associate Professor of Beekeeping.
GEORGE E. GAGE, Ph.D., ... 27 Sunset Avenue.
Associate Professor of Animal Pathology.
WALTER W. CHENOWETH, A.B., M.Sc., ... North Amherst.
Associate Professor of Pomology.
F. H. HESSELINK VAN SUCHTELEN, Ph.D., ... 30 North Prospect Street.
Associate Professor of Microbiology.
ARNO H. NEHRLING, ... 5 Kendrick Place.
Associate Professor of Floriculture.
PAUL J. ANDERSON, Ph.D., ... 24 Pleasant Street.
Associate Professor of Botany.
RALPH J. WATTS, B.Sc., ... 101 Butterfield Road.
Secretary of the College.
CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.
C. ROBERT DUNCAN, B.Sc., C.E., ... 23 Lincoln Avenue.
Assistant Professor of Mathematics.
ARTHUR K. HARRISON, ... 8 Allen Street.
Assistant Professor of Landscape Gardening.
ELVIN L. QUAIFE, B.Sc.Agr., ... 103 Butterfield Road.
Assistant Professor of Animal Husbandry.
WILLIAM L. MACHMER, A.M., M.E., ... 3 Kendrick Place.
Assistant Professor of Mathematics.
WALTER E. PRINCE, Ph.B., A.M., ... 4 Kendrick Place.
Assistant Professor of English.
HAROLD E. ROBBINS, B.Sc., A.M., ... 4 Nutting Avenue.
Assistant Professor of Physics.
ORTON L. CLARK, B.Sc., ... 16 College Street.
Assistant Professor of Botany.
LOYAL F. PAYNE, B.Sc., ... 12 Chestnut Street.
Assistant Professor of Poultry Husbandry.

EARL JONES, M.Sc., ... 3 Phillips Street.
Assistant Professor of Agronomy.
CHARLES H. THOMPSON, M.Sc., ... 77 South Pleasant Street.
Assistant Professor of Horticulture.
ANDREW S. THOMSON, Ph.B., A.M., ... 10½ Kellogg Avenue.
Assistant Professor of Market Gardening.
ORVILLE A. JAMISON, M.Sc., ... 7 East Pleasant Street.
Assistant Professor of Dairying.
JOHN T. WHEELER, B.Sc.Agr., ... 13 Fearing Street.
Assistant Professor of Horticulture.
CHARLES H. PATTERSON, A.B., A.M., ... 54 Pleasant Street.
Assistant Professor of English.
FRANK W. RANE, M.F., ... Boston.
Lecturer in Forestry.
HELENA T. GOESSMANN, M.Ph., ... 13 Main Street.
Instructor in English.
WILLIAM L. HARMOUNT, A.B., ... 86 Pleasant Street.
Instructor in French.
ARTHUR N. JULIAN, A.B., ... Farview Way.
Instructor in German.
FREDERICK A. MCLAUGHLIN,[1] B.Sc., ... 24 Pleasant Street.
Instructor in Botany.
SAMUEL COONS, ... 2 McClellan Street.
Instructor in Dairying.
HAROLD M. GORE, B.Sc., ... 8 Allen Street.
Instructor in Physical Education.
BURT A. HAZELTINE, B.Sc., ... 4 North Prospect Street.
Instructor in Mathematics.
WILLIAM S. REGAN, Ph.D., ... 86 Pleasant Street.
Instructor in Entomology.
FRANK P. RAND, A.M., ... North Amherst.
Instructor in English.
ARAO ITANO, Ph.D., ... 7 East Pleasant Street.
Instructor in Microbiology.
WALTER M. PEACOCK, M.S.Agr., ... 24 Pleasant Street.
Instructor in Farm Management.
GEORGE W. MARTIN, M.Sc., ... 7 Phillips Street.
Instructor in Botany.
HARRY D. DRAIN, B.Sc.Agr., ... 24 Pleasant Street.
Instructor in Dairying.
STANLEY C. BALL, Ph.D., ... 45 Amity Street.
Instructor in Zoölogy.
RALPH M. RUTLEDGE, M.Sc., ... 13 Fearing Street.
Instructor in Agricultural Economics.
EVERETT H. RUCKER, B.Sc., A.M., ... 5 School Street.
Instructor in Poultry Husbandry.
CHARLES H. GOULD, B.Sc., ... 4 Nutting Avenue.
Field Agent.
WILLIAM J. FITZMAURICE, ... – –
Assistant in Physical Education.
PAUL SEREX, Jr., M.Sc., ... 116 Pleasant Street.
Assistant in Chemistry.
FREDERICK G. MERKLE, B.Sc., ... East Street.
Assistant in Agronomy.
HARRY C. THOMPSON, B.Sc., ... 16 North Prospect Street.
Assistant in Physics.
PHILIP W. PAYNE, A.B.,[2] 5 Kendrick Place.
Assistant in English.
JOSEPH NOVITSKI,[2] Pelham Road.
Assistant in Rural Sociology.

[1] On leave, 1916–17.

[2] Part time.

GRADUATE ASSISTANTS.

ROBERT P. ARMSTRONG, M.Sc., ... Phi Sigma Kappa House.
Department of Pomology, Experiment Station.
ROY C. AVERY, B.Sc., ... 15 Spring Street.
Industrial Tests, Experiment Station.
PAUL BEEBE, A.B., ... 45 Pleasant Street.
Department of Chemistry.
J. STANLEY COBB, B.Sc., ... 24 Pleasant Street.
Department of Agronomy.
SAMUAL H. DE VAULT,[1] M.A., ... 9 Fearing Street.
Department of Agricultural Economics, Experiment Station.
WILLIAM L. DORAN,[2] B.Sc., ... Clark Hall.
Department of Botany.
ERNEST E. FISH, B.Sc., ... 24 Pleasant Street.
Department of Animal Husbandry.
EGERTON G. HOOD, B.Sc., ... 15 Spring Street.
Industrial Tests, Experiment Station.
HAROLD KELLEY, B.Sc., ... 116 Pleasant Street.
Department of Chemistry.
RALPH L. MACNEIL, B.Sc., ... 5 Spring Street.
Department of Chemistry.
SATWAJI G. MUTKEKAR, B.Agr., ... Farview Way.
Industrial Tests, Experiment Station.
GERALD E. PERRY, B.Sc., ... 17 Amity Street.
Department of Chemistry.
ARTHUR L. PRINCE, A.B., ... 4 Kendrick Place.
Department of Chemistry.
JAMES A. PURINGTON, B.Sc., ... 116 Pleasant Street.
Department of Agronomy.
GEORGE B. RAY, B.Sc., ... East Pleasant Street.
Department of Microbiology.
IRVING C. ROOT, B.Sc., ... 24 Pleasant Street.
Department of Landscape Gardening.
LLOYD L. STEWART, B.Sc., ... 18 Nutting Avenue.
Department of Poultry Husbandry.
STUART C. VINAL, B.Sc., ... 112 Pleasant Street.
Department of Entomology, Experiment Station.
DONALD WHITE, B.A., ... 24 Pleasant Street.
Department of Botany.
CARRICK E. WILDON, B.Sc., ... 66 Pleasant Street.
Department of Floriculture.
ELWIN G. WOOD, B.Sc., ... Wilder Hall.
Department of Pomology.

THE EXPERIMENT STATION STAFF.

ADMINISTRATION.

WILLIAM P. BROOKS, Ph.D., ... 6 Farview Way.
Director.
JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Vice-Director.
FRED C. KENNEY, ... Mount Pleasant.
Treasurer.
CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.

DEPARTMENT OF AGRICULTURAL ECONOMICS.

ALEXANDER E. CANCE, Ph.D., ... 9 Fearing Street.
In charge of Department.

[1] Services began Jan. 9, 1917. [2] Resigned, to take effect Nov. 20, 1916.

DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., ... 6 Farview Way.
Agriculturist.
HENRY J. FRANKLIN, Ph.D., ... Wareham.
In charge of Cranberry Investigation.
EDWIN F. GASKILL, B.Sc., ... North Pleasant Street.
Assistant Agriculturist.
ROBERT L. COFFIN, ... 19 Phillips Street.
Assistant.

DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

A. VINCENT OSMUN, M.Sc., ... 5 Kendrick Place.
Botanist.
GEORGE H. CHAPMAN, Ph.D., ... Fearing Street.
Research Physiologist.
PAUL J. ANDERSON, Ph.D., ... 24 Pleasant Street.
Associate Plant Pathologist.
ORTON L. CLARK, B.Sc., ... 16 College Street.
Assistant Plant Physiologist.

DEPARTMENT OF ENTOMOLOGY.

HENRY T. FERNALD, Ph.D., ... 44 Amity Street.
Entomologist.
BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Apiarist.
ARTHUR I. BOURNE, A.B., ... 12 East Pleasant Street.
Assistant Entomologist.

DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Chemist.
EDWARD B. HOLLAND, Ph.D., ... 28 North Prospect Street.
Associate Chemist in charge of Research Division.
FRED W. MORSE, M.Sc., ... 40 Pleasant Street.
Research Chemist.
HENRI D. HASKINS, B.Sc., ... 14 Amity Street.
In charge of Fertilizer Division.
PHILIP H. SMITH, M.Sc., ... 102 Main Street.
In charge of Feed and Dairy Division.
LEWELL S. WALKER, B.Sc., ... 19 Phillips Street.
Assistant.
RUDOLPH W. RUPRECHT,[1] Ph.D., ... 24 Pleasant Street.
Assistant.
CARLETON P. JONES, M.Sc., ... Bank Block.
Assistant.
CARLOS L. BEALS, M.Sc., ... 4 Kendrick Place.
Assistant.
JAMES P. BUCKLEY, B.Sc., ... 29 Lincoln Avenue.
Assistant.
WINDOM A. ALLEN, B.Sc., ... 24 Pleasant Street.
Assistant.
JOHN B. SMITH,[2] B.Sc., ... North Prospect Street.
Assistant.
ROBERT S. SCULL,[3] B.Sc., ... Mount Pleasant.
Assistant.
JAMES T. HOWARD, ... 46 Pleasant Street.
Collector.
HARRY L. ALLEN, ... 89 Main Street.
Assistant.
JAMES R. ALCOCK, ... North Amherst.
Assistant.

[1] Resigned Nov. 30, 1916.
[2] Services began Oct. 1, 1917.
[3] Services began Feb. 1, 1917.

DEPARTMENT OF HORTICULTURE.

FRANK A. WAUGH, M.Sc., Horticulturist. Campus.
FRED C. SEARS,[1] M.Sc., Pomologist. Mount Pleasant.
JACOB K. SHAW, Ph.D., Research Pomologist. 5 Farview Way.

DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., Meteorologist. 33 North Prospect Street.

DEPARTMENT OF MICROBIOLOGY.

CHARLES E. MARSHALL, Ph.D., In charge of Department. 44 Sunset Avenue.
F. H. HESSELINK VAN SUCHTELEN, Ph.D., Associate Professor of Microbiology. 30 North Prospect Street.

DEPARTMENT OF POULTRY HUSBANDRY.

JOHN C. GRAHAM, B.Sc.Agr., In charge of Department. Lincoln Avenue.
HUBERT D. GOODALE, Ph.D., Research Biologist. North Amherst.

DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., Veterinarian. 42 Lincoln Avenue.
GEORGE E. GAGE, Ph.D., Associate Professor of Animal Pathology. 27 Sunset Avenue.
JOHN B. LENTZ, A.B., V.M.D., Assistant in Veterinary Science. 24 Pleasant Street.
ARNOLD P. STURTEVANT,[2] A.B., Assistant in Veterinary Science. 41 Lincoln Avenue.

THE EXTENSION SERVICE STAFF.

WILLIAM D. HURD, M.Agr., Director of the Extension Service and Supervisor of Short Courses. 46 Amity Street.
EARNEST D. WAID, B.Sc.Agr., Assistant Director. 61 Amity Street.
SUMNER R. PARKER, B.Sc., Extension Professor of Rural Organization and County Agent Leader. 51 Amity Street.
EZRA L. MORGAN, A.M., Extension Professor of Community Planning. 2 Allen Street.
LAURA COMSTOCK, Extension Professor of Home Economics. 84 Pleasant Street.
E. FARNHAM DAMON, B.Sc., Extension Associate Professor of Agricultural Economics. Bank Block.
GEORGE L. FARLEY, M.Sc., Supervisor of Junior Extension Work. 31 Lincoln Avenue.
ERWIN H. FORBUSH, Supervisor of Correspondence Courses. 8 Nutting Avenue.
ETHEL H. NASH, Extension Instructor in Agricultural Education. 16 Nutting Avenue.
ALFRED G. LUNN, B.Sc., Extension Instructor in Poultry Husbandry. North Amherst.
ERIC N. BOLAND,[3] M.Sc., Extension Instructor in charge of Boys' and Girls' Pig Club Work. Bank Block.
MARIE SAYLES, B.Sc., Extension Instructor in Home Economics. 79 Pleasant Street.

[1] On leave, first term, 1916–17.
[2] Resigned, to take effect Nov. 30, 1916.
[3] Resigned, to take effect Dec. 2, 1916.

WESLEY H. BRONSON, B.Sc., ... Lincoln Block.
Extension Instructor in Farm Demonstration.
WILLIAM F. TURNER, B.Sc., ... 37 Cottage Street.
Extension Instructor in Animal Husbandry.
FRANK A. C. SMITH, B.Sc., ... 24 Pleasant Street.
Extension Instructor in Civic Improvement.
AUSTIN D. KILHAM, B.Sc.Agr., ... 24 Pleasant Street.
Extension Instructor in Pomology.
VICTOR A. RICE,[1] B.Sc., ... 24 Pleasant Street.
Extension Instructor in charge of Pig Club Work.
ROSWELL W. HENNINGER,[2] 87 Pleasant Street.
Extension Instructor in charge of Poultry Club Work.

THE CLERICAL STAFF.

ELBERT L. ARNOLD, ... North Amherst.
Chief Clerk, Extension Service.
ELEANOR BARKER, ... 9 Phillips Street.
Clerk, Division of Horticulture.
ELEANOR F. BISHOP, ... 3 Spaulding Street.
Clerk, Treasurer's Office.
EVELYN BREWSTER, B.Sc., ... 9 Phillips Street.
Clerk, President's Office.
JOHN K. BROADFOOT, ... 7½ East Pleasant Street.
Cashier, Treasurer's Office.
MAUDE CHAMBERS,[3] 6 Allen Street.
Inventory Clerk, Treasurer's Office.
LENA V. CHAPMAN, ... 77 South Pleasant Street.
Library Assistant.
LUCIA G. CHURCH, ... North Amherst.
First Clerk, Experiment Station.
DORIS CLARK,[1] North Amherst.
Stenographer, Extension Service.
MARCELLA P. CURRY, B.Sc., ... Draper Hall.
Clerk, Department of Poultry Husbandry.
LALIA M. DAMON, ... 10 Nutting Avenue.
Cataloguer, Library.
LOUISE G. DAVIDSON, ... 7 Northampton Road.
Telephone Operator, Stockbridge Hall.
LLEWELYN L. DERBY, ... 81 Pleasant Street.
Assistant, Department of Physical Education.
HAZEL DEWAR, ... 6 Clifton Avenue.
Stenographer, Division of Agriculture.
MARION F. DONDALE, A.B., ... 101 Butterfield Road.
Clerk, Graduate School and Department of Microbiology.
F. ETHEL FELTON, A.B., ... 8 Allen Street.
Clerk, Director's Office, Experiment Station.
KATHERINE L. FENTON,[4] Northampton.
Stenographer, Department of Dairying.
LINA E. FISHER, ... 28 Pleasant Street.
Clerk, Department of Chemistry.
GRACE E. GALLOND, ... 28 Pleasant Street.
Clerk, Department of Dairying.
MARGARET T. GASKELL, ... 105 Main Street.
Stenographer, offices of Dean and Registrar.
LILLIAN M. GELINAS, ... 77 Pleasant Street.
Clerk, President's Office.
ALICE M. GILBERT,[5] 9 Phillips Street.
First Clerk, Division of Agriculture.
CORA B. GROVER, ... North Amherst.
Clerk, Director's Office, Extension Service.

[1] Services began Dec. 4, 1916.
[2] Services began Jan. 1, 1917.
[3] Services began Nov. 1, 1916.
[4] Resigned Feb 13, 1917.
[5] Resigned Nov. 9, 1916.

Marion Guertin, Clerk, Department of Beekeeping.	20 Pleasant Street.
Lillian S. Hadfield, Clerk, Extension Service.	9 Phillips Street.
Laura W. Hager, A.B., Clerk, Department of Agricultural Economics.	South Deerfield.
Mary G. Hanifin,[1] Clerk, Division of Agriculture.	Northampton.
Mary E. Horton, Clerk, Department of Rural Sociology.	79 Pleasant Street.
Alice M. Howard, First Clerk, Experiment Station.	North Amherst.
Lorian P. Jefferson, A.M., Research Secretary, Division of Rural Social Science.	84 Pleasant Street.
Helena Keiber, Stenographer, Extension Service.	50 Pleasant Street.
Clarence Kendall,[2] Clerk, Extension Service.	Hadley.
Ethel L. Kennedy, Clerk, Extension Service.	9 Phillips Street.
Helen Martin,[3] Stenographer, Department of Entomology.	19 South East Street.
Irene A. Martin, Stenographer, Treasurer's Office.	19 South East Street.
Rebecca L. Mellor, Clerk, Experiment Station.	10 Kellogg Avenue.
Nell C. Milton, Stenographer, Division of Rural Social Science.	Draper Hall.
Elizabeth E. Mooney, Stenographer, Department of Poultry Husbandry.	Draper Hall.
Grace B. Nutting, Ph.B., Curator, Department of Botany.	North Amherst.
Bridie E. O'Donnell, Clerk, Department of Entomology.	Hadley.
Helen C. Pomeroy, Clerk, Department of Floriculture.	Draper Hall.
Frances Powers,[4] Stenographer, Department of Dairying.	Lincoln Avenue.
Vivian Roy, Library Assistant.	5 McClellan Street.
Edna M. Sanders, Bookkeeper, Treasurer's Office.	Hadley.
Mary I. Shores, Clerk, Dean's Office.	Bank Block.
Elsa Slattery,[5] Stenographer, Extension Service.	Northampton.
Ethelyn Streeter, Stenographer, Division of Horticulture.	South Deerfield.
Flora E. Torrey, Clerk, Extension Service.	North Mt. Pleasant.
Ethel M. Turner, Library Assistant.	55 Pleasant Street.
Olive M. Turner, B.Sc., Clerk, Registrar's Office.	22 Spaulding Street.
Henrietta L. Webster, First Clerk, Treasurer's Office.	Draper Hall.
Ellen L. Welch,[6] Stenographer, Department of Botany.	17 Fearing Street.
Aurelia B. Wentworth, First Clerk, Division of Agriculture.	South Amherst.

[1] Services began Nov. 13, 1916.
[2] Services began Jan. 15, 1917.
[3] Services began Oct. 14, 1916.
[4] Services began Feb. 1, 1917.
[5] Resigned, to take effect Dec. 9, 1916.
[6] Services began Jan. 2, 1917.

STAFF OF OPERATING AND MAINTENANCE.

JOHN J. BARBER, ... Campus.
Farm Superintendent.

THOMAS BUTTERWORTH, ... 6 Phillips Street.
Engineer.

JOHN L. BYARD, ... 21 Pleasant Street.
Superintendent of the Apiary.

LAWRENCE S. DICKINSON, B.Sc., ... 2 Farview Way.
Superintendent of Grounds.

CLARENCE A. JEWETT, ... 112 Pleasant Street.
Superintendent of Buildings.

ORA L. KENNEDY, ... Draper Hall.
Manager of the Dining Hall.

JOHN J. LEE, ... 38 Cottage Street.
Assistant to the Military Detail.

FLORENCE LEVENSALER, ... Infirmary.
Resident Nurse.

GEORGE F. PUSHEE, ... 21 Maple Ave., Northampton.
Shop Assistant, Rural Engineering.

ALEXANDER SMART, ... 39 East Pleasant Street.
Assistant to the Commandant.

NEWTON WALLACE,[1] Campus.
Electrician.

JAMES WHITING, ... 16 Hallock Street.
Foreman, Department of Floriculture.

[1] Retired Jan. 31, 1917.

Standing Committees of the Faculty.

1916–17.

Catalogue and Other Publications.

Associate Professor Neal.
Professor Lockwood.
Secretary Watts.

Commencement.

Dean Lewis.
Treasurer Kenney.
Captain Fleet.
Professor Peters.
Associate Professor Nehrling.
Secretary Watts.
Assistant Professor Robbins.

Course of Study.

President Butterfield.
Dean Lewis.
Professor Hart.
Professor Waugh.
Professor Foord.
Professor Sprague.
Professor Fernald.
Professor Ostrander.
Professor Marshall.
Professor Chamberlain.
Professor Cance.
Associate Professor Chenoweth.

Discipline (Advisory).

Dean Lewis.
Registrar Hasbrouck.
Professor Hicks.
Professor Phelan.
Associate Professor Mackimmie.

Employment.

Professor Sears.
Dean Lewis.
Treasurer Kenney.
Professor Lockwood.
Professor McNutt.
Secretary Watts.

ENTRANCE EXAMINATIONS AND ADMISSION.

Registrar HASBROUCK.
Dean LEWIS.
Professor OSMUN.
Professor ERNEST ANDERSON.
Associate Professor ASHLEY.
Assistant Professor DUNCAN.
Mr. RAND.

HEALTH AND SANITATION.

Professor MARSHALL.
Treasurer KENNEY.
Captain FLEET.
Professor HICKS.
Miss COMSTOCK.

LIBRARY.

Professor MARSHALL.
Professor SPRAGUE.
Professor GUNNESS.
Assistant Professor A. S. THOMSON.
Mr. GREEN.

SCHEDULE.

Professor LOCKWOOD.
Professor PETERS.
Assistant Professor DUNCAN.

SCHOLARSHIP.

Dean LEWIS.
Registrar HASBROUCK.
Professor CHAMBERLAIN.
Professor ERNEST ANDERSON.
Associate Professor MACKIMMIE.
Assistant Professor ROBBINS.
Assistant Professor MACHMER.
Mr. RAND.

STUDENT LIFE.

President BUTTERFIELD.
Dean LEWIS.
Treasurer KENNEY.
Director HURD.
Professor CHAMBERLAIN.
Professor SPRAGUE.
Professor HART.
Professor CRAMPTON.
Professor PHELAN.
Professor LOCKWOOD.
Professor ERNEST ANDERSON.
Professor HICKS.
Associate Professor MACKIMMIE.
Secretary WATTS.
Associate Professor PAUL J. ANDERSON.
Assistant Professor HARRISON.
Assistant Professor QUAIFE.
Assistant Professor MACHMER.
Assistant Professor A. S. THOMSON.
Assistant Professor ROBBINS.

Unclassified Students.

Dean Lewis.
Professor Waugh.
Professor Foord.
Registrar Hasbrouck.
Assistant Professor Machmer.

Appointed to Athletic Board.

Dean Lewis.
Registrar Hasbrouck.
Professor Osmun.

Appointed to Non-Athletic Board.

Professor Lockwood.
Assistant Professor Machmer.

THE COLLEGE.

Admission.

A. Application for Admission.

All correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. Modes of Admission.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

Certificates. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present at least three of the necessary fourteen credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

Examinations. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

In June,	Amherst, Department of Physics building. Massachusetts Institute of Technology, Cambridge, Mass. Worcester, Horticultural Hall.
In September,	Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 28-30, inclusive, 1917. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M.	Registration.[1]
8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Solid geometry.
4.00 P.M.	Physics.

Second Day.

8.00 A.M.	Required English.
11.00 A.M.	Algebra.
2.00 P.M.	History, required and elective.

Third Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1917, the examinations will be given September 12–15, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M.	Registration.
1.15–5.00 P.M.	Greek A and B.

Second Day.

8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Solid geometry.
4.00 P.M.	Physics.

Third Day.

8.00 A.M.	Required English.
11.00 A.M.	Algebra, agriculture.
2.00 P.M.	History, required and elective.

Fourth Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

[1] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

C. Requirements for Admission.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year. **Neither more nor less credit will be given in any subject than is indicated in the table below.** Fourteen units must be offered for admission. In the list given below, *every subject in black-faced type is prescribed and no substitution is allowed.* The subjects so typed total eight and one-half units. In addition to these points five and one-half more units must be chosen from the subjects printed in light-faced type. Not more than four half-credit units may be offered. No applicant deficient in both algebra and plane geometry will be admitted.

Agriculture[1] (see also note at end of volume),	½ or 1
Botany,[2]	½ or 1
Chemistry,[2]	1
Algebra,	1½
Plane geometry,	1
Solid geometry,	½
Trigonometry,	½
Physics,[2]	1
Geology,	½
Physiography,	½
Physiology,	½
Zoölogy,[2]	½
History[3] (Ancient; Medieval and Modern; English; General; United States and Civics), *any one,*	1[4]
English 1,	1½
English 2,	1½
Modern Language (elementary French or elementary German),	2
Elementary French,[5]	2
Elementary German,[5]	2
Intermediate French,	1
Advanced French,	1
Intermediate German,	1
Advanced German,	1
Greek A,[1]	2
Greek B,[1]	1
Latin A,	2
Latin B,	1
Commercial geography,[6]	½
Drawing,[6]	½
Manual training,[6]	½ or 1

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, below).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books; but their certificates must state that note-books have been satisfactorily completed.

[1] Examination in September only.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] One must be offered for the required point; one, two or three others may be offered for elective points.

[4] For each offered.

[5] May be offered as elective if not offered to satisfy *prescribed* points.

[6] On certificate only, no examination given.

D. Statement of Preparation Required for Admission.

Agriculture. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information: but it will call for not less than one-half year of creditable work of high school grade. **The examination in agriculture will be given in September only.**

Botany. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Steven's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements. The keeping of a note-book is required.

Mathematics. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the

sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

Physics. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Text-book of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

Physiology. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

Zoölogy, Physiography, Geology. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

History. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers,

in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

English. — For 1916–19 inclusive: —

The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature* (One and One-half Units). — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. Reading. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I.: —

Group I. Classics in Translation: The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of Books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of Books XI., XIII., XIV., XV., XVIII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any one selection from Group I. a selection from any other group may be substituted.

Group II. Shakspere: "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo

and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"[1] "Macbeth;"[1] "Hamlet."[1]

Group III. Prose Fiction: Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voyages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one;* Jane Austen's novels, any *one;* Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens' novels, any *one;* Thackeray's novels, any *one;* George Eliot's novels, any *one;* Mrs. Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reade's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevenson's "Treasure Island" or "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one;* Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables" or "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

Group IV. Essays, Biography, etc.: Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tatler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" selections from Irving's "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" selections from Lamb's "Essays of Elia" (about 100 pages); selections from Lockhart's "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison and Steele in the English Humorists;" Macauley: any one of the following essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay:" selections from Trevelyan's "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years Before the Mast;" Lincoln's "Selections," including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address, the letter to Horace Greeley, together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson and later writers; a collection of "Letters" by various standard writers.

Group V. Poetry: Palgrave's "Golden Treasury" (first series), Books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury" (first series), Book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens" and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake" or "Marmion;"

[1] If not chosen for study under B.

Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The Armada," "Ivry;" Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Herve Riel," "Pheidippides," "My Lost Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum"and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

B. Study. — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. Drama: Shakspere's "Julius Cæsar," "Macbeth," "Hamlet."

Group II. Poetry: Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

Group III. Oratory: Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

Group IV. Essays: Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading.

The examination in literature will include: —

(*a*) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above.

(*b*) A test on the books prescribed for study, which will consist of questions upon their content and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

French. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

German. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

Greek. — Greek will receive credit as an elective requirement upon either examination or certification, as follows. **(The examination in Greek A and Greek B will be given in September only.)**

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

Latin. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages

selected from either Books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," Books I. to IV.

Commercial Geography.[1] — Preparation should be made in a course equivalent to that laid down in Adams' "Commercial Geography," Trotter's "Geography of Commerce," or a similar work. (No examination given.)

Drawing.[1] — The applicant may offer either freehand or mechanical drawing or both. He must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable him to draw correctly a simple geometric model from memory; or, if he present mechanical drawing, he must have working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented, see "Manual Training." (No examination given.)

Manual Training.[1] — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

E. Admission to Advanced Standing.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. Other Information about Entrance.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

[1] On certificate only; no examination given.

3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. Not more than five and one-half credits from the elective group will be accepted. No candidate deficient in both algebra and plane geometry will be admitted.

4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination during the first week of the second term. (2) Second entrance condition examination before the beginning of the period of final examinations of the second term, upon the payment of a fee of $5 to the treasurer.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

G. Unclassified Students.

All requests for information concerning admission of unclassified students should be addressed to Dean Edward M. Lewis, chairman of committee on unclassified students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-year high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

9. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

10. No unclassified student shall be allowed to participate in any intercollegiate contests.

H. One-year Vocational Course in Poultry Husbandry.

Purpose. — This course is designed for graduates of the agricultural vocational schools and others who wish to prepare themselves for practical poultry keeping and can spend only one year at college.

Scope. — The work covers seven detailed courses in poultry husbandry, as well as short-course work in fruit growing, market gardening, bee culture, animal husbandry or other subjects that will be helpful to poultry raisers. In addition to classroom and laboratory exercises each student is required to put in from 25 to 30 hours per week at the plant in the care and management of poultry for the purpose of becoming proficient in the various branches of the work.

Entrance Requirements. — Applicants must be at least eighteen years of age and have a good elementary education.

Fees. — There is no tuition for residents of Massachusetts, but a laboratory fee of $5 is required for both the fall and spring terms.

Note. — The course is limited to 16 students.

Courses of Instruction.

TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

Freshman Year.

First Term.

All work required.

Subject.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 1 or 4,	3
Algebra,	Mathematics 1,	5
Language,	French or German 1 or 4,	3
English,	English 1,	3
Agriculture and horticulture,	Agronomy 1, Animal Husbandry 1, Pomology 1, Poultry 1.	2
Tactics,	Military 1,	1
Drill,	Military 4,	1
Hygiene,	Physical Education 1,	1
Public speaking,	Public Speaking 1 (one-third of the class),	1
		20

College life (attendance without credit).

Second Term.

Chemistry,	Chemistry 2 or 5,	3
Algebra,	Mathematics 2,	2
Trigonometry,	Mathematics 5,	3
Language,	French or German 2 or 5,	3
English,	English 2,	3
Agriculture and horticulture,	Agronomy 1, Animal Husbandry 1, Pomology 1, Poultry 1.	2
Gymnastics,	Physical Education 5,	1
Geology,	Geology 2,	2
Public speaking,	Public Speaking 1 (one-third of class),	1
		20

College life (attendance without credit).

FRESHMAN YEAR — *Concluded.*

THIRD TERM.

SUBJECT.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 3 or 6,	3
Solid geometry,	Mathematics 3,	3
Mensuration,	Mathematics 6,	2
Language,	French or German 3 or 6,	3
English,	English 3,	3
Botany,	Botany 3,	3
Tactics,	Military 3,	1
Drill,	Military 6,	1
Public speaking,	Public Speaking 1 (one-third of class),	1
		20

College life (attendance without credit).

SOPHOMORE YEAR.

FIRST TERM.

SUBJECT.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
Required.				
Physics,	25	3	1	4
Zoölogy,	25	1	2	3
Botany,	25	1	2	3
English,	25	2	–	2
Military,	25	1	–	1
Military,	28	–	1	1
Total required,	–	–	–	14
Elective.				
Chemistry,	25	1	2	3
French,	25 or 28	3	–	3
German,	25 or 28	3	–	3
Drawing,	25	–	3	3
Animal husbandry,	25	2	1	3
Rural engineering,	25	–	2	2

Sophomore Year — *Concluded.*

Second Term.

Subject.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
Required.				
Physics,	26	2	1	3
Agricultural economics,	26	5	–	5
English,	26	2	–	2
Physical education,	26		1	1
	–	–	–	11
Elective.				
Chemistry,	26	1	2	3
French,	26 or 29	3	–	3
German,	26 or 29	3	–	3
Mathematics,	26	2	–	2
Drawing,	26	–	3	3
Entomology,	26	3	–	3
Animal husbandry,	26	1	2	3
Rural engineering,	26	–	2	2
Botany,	26	1	2	3
Economic sociology,	26	5	–	5

Third Term.

Required.				
Rural sociology,	27	3	–	3
Agronomy,	27	4	1	5
English,	27	2	–	2
Military,	27	1	–	1
Military,	30	–	1	1
Total required,	–	–	–	12
Elective.				
Chemistry,	27	1	4	5
Chemistry,	30	3	2	5
French,	27 or 30	3	–	3
German,	27 or 30	3	–	3
Mathematics,	27	–	3	3
Drawing,	27	–	3	3
Entomology,	27	–	2	2
Geology,	27	3	2	5
Physics,	27	4	1	5
Horticulture,	27	2	1	3
Zoölogy,	27	1	2	3

MAJORS: JUNIOR AND SENIOR YEARS.

General Statement.

A major consists of 45 credit hours of correlated work, to be arranged by the student and an instructor called the adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

Rules governing Majors.

Rule 1. *Election.* — Each student, before the first term of his junior year, shall elect a major subject from the list of majors given below; and this major shall consist of 45 credit hours of correlated work.

Rule 2. *Minimum Credits.* — The minimum number of credits for graduation shall be 234 credit hours, inclusive of military drill and physical education.

Rule 3. *Maximum Credits.* — The maximum number of credits for any term of the junior or senior year shall be 22; the minimum shall be 19.

Rule 4. *Humanities and Rural Social Science.* — A minimum of 18 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 5 credit hours will be required in each of the divisions, except that the minimum for the class of 1918 shall be 22 hours.

Rule 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 45 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

Rule 6. *Free Electives.* — Each student during his junior and senior years is required to take 45 hours in his major and also 18 hours in the Divisions of the Humanities and Rural Social Science, making a total of 63 hours (but see Rule 4). He is allowed free choice of courses to complete his required hours.

Rule 7. *Registration.* — No junior or senior shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office three weeks before the close of each term.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the succeeding term and countersign the card.

(3) Each course card must be filled out, giving the name of student, his college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours

of free elections added by the student, the card must be returned to the registrar one week before the beginning of the final examination period.

Rule 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by the committee on scholarship, they become operative at the beginning of the term following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

Agriculture. (Major.)

Professor James A. Foord, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 I.	5	I.	Animal Husbandry 25,	3	Agronomy 50,	5	Animal Husbandry 75,	3
Agronomy,	76 III.	5		Rural Engineering 25,	2	Dairying 50,	5	Rural Engineering 75,	5
Animal Husbandry,	51 III.	3							
Animal Husbandry,	75 I.	3	II.	Mathematics 26,	2			Farm Management 75,	3
Animal Husbandry,	76 II.	3		Animal Husbandry 26,	3			Animal Husbandry 76,	3
Dairying,	50 I.	5		Rural Engineering 26,	2				
Farm Management,	75 II.	3	III.	Chemistry 30,	5	Microbiology 50,	5	Agronomy 76,	5
Farm Management,	76 III.	5		Mathematics 27,	3	Animal Husbandry 51,	3	Farm Management 76,	5
Microbiology,	50 I.			Horticulture 27,	3				
or		5							
Microbiology,	50 III.		IV.						
Rural Engineering,	75 I.	5							
		42							

Sophomore Elective Prerequisites (Required). — Animal Husbandry 25 and 26, Rural Engineering (shop work) 25 and 26, Chemistry 30, Mathematics 26 and 27, and Horticulture 27.

Additional Information. — Dairying 75, Pomology 50 and 51, Rural Engineering 78, and Veterinary 51 and 78 are suggested as additional courses for the student fitting himself for general agriculture.

Agronomy. (Major.)

Assistant Professor Earl Jones, *Acting Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 **I.**	5	**I.**	Chemistry 25,	3	Agronomy 50,	5	Agronomy 75,	5
Agronomy,	51 **III.**	5		German 25 or 28,	3	Chemistry 51,	8	Animal Husbandry 75,	5
Agronomy,	75 **I.**	5							
Agronomy,	77 **II.**	5	**II.**	Botany 26,	3	Chemistry 52,	8	Agronomy 77,	5
Animal Husbandry,	75 **I.**	3		Chemistry 26,	3				
Chemistry,	51 **I.**	8		German 26 or 29,	3				
				Mathematics 26,	2				
Chemistry,	52 **II.**	8	**III.**	German 27 or 30,	3	Agronomy 51,	5	Farm Management 76,	5
Farm Management,	76 **III.**	5		Mathematics 27,	3				
				Geology 27,	5				
		44							
			IV.						

Sophomore Elective Prerequisites (Required). — Chemistry 25 and 26, German 25 or 28, 26 or 29, 27 or 30, Geology 27, Botany 26.
Advised. — Mathematics 26 and 27.

Animal Husbandry. (Major.)

Professor John C. McNutt, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 I.	5	I.	Animal Husbandry 25,	3	Agronomy 50,	5	Animal Husbandry 75,	3
Animal Husbandry,	51 III.	3				Veterinary 50,	5		
Animal Husbandry,	50 II.	1				Dairying 50,	5		
Animal Husbandry,	52 III.	3	II.	Animal Husbandry 26,	3	Animal Husbandry 50,	1	Animal Husbandry 76,	3
Animal Husbandry,	75 I.	3						Animal Husbandry 78,	3
Animal Husbandry,	76 II.	3						Farm Management 75,	3
Animal Husbandry,	77 III.	3	III.	Chemistry 30,	5	Animal Husbandry 51,	3	Animal Husbandry 80,	1
Animal Husbandry,	78 II.	3				Animal Husbandry 52,	3	Animal Husbandry 77,	3
Animal Husbandry,	80 III.	1						Farm Management 76,	5
Dairying,	50 I.	5	IV.						
Farm Management,	75 II.	3							
Farm Management,	76 III.	5							
Veterinary,	50 I.	5							
		43							

Sophomore Elective Prerequisites (Required). — Animal Husbandry 25 and 26, Chemistry 30.

Additional Information. — The balance of the sophomore electives allowed are left to the student to choose.

Dairying. (Major.)

Professor William P. B. Lockwood, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Animal Husbandry,	52 **III.**	3	**I.**	Animal Husbandry 25,	3	Dairying 50,	5	Animal Husbandry 75,	3
Animal Husbandry,	75 **I.**	3		Rural Engineering 25,	2	Microbiology 50,	5	Microbiology 82,	5
Animal Husbandry,	76 **II.**	3							
Dairying,	50 **I.**	5	**II.**	Animal Husbandry 26,	3	Rural Engineering 77,	5	Farm Management 75,	3
Dairying,	51 **III.**	5		Rural Engineering 26,	2	Microbiology 51,	5	Animal Husbandry 76,	3
Dairying,	75 **II.**	5				(Prerequisite to 82.)		Dairying 75,	5
Dairying,	76 **III.**	5	**III.**	Chemistry 30,	5	Animal Husbandry 52,	3	Dairying 76,	5
Farm Management,	75 **II.**	3				Dairying 51,	5		
Microbiology,	50 **I.**	5							
Microbiology,	82 **I.**	5							
Rural Engineering,	77 **II.**	5	**IV.**						
		47							

Sophomore Elective Prerequisites (Required). — Animal Husbandry 25 and 26, Rural Engineering 25 and 26, Chemistry 30.

Additional Information. — The balance of the sophomore electives allowed are left to the student to choose.

Poultry Husbandry. (Major.)

Professor John C. Graham, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics,	75 I.	5	I.			Poultry 50,	3	Poultry 76,	5
Animal Husbandry,	51 III.	3				Poultry 51,	2	Poultry 77,	5
Poultry Husbandry,	50 I.	3				Agricultural Economics 75,	5	Pomology 50,	3
Poultry Husbandry,	51 I.	2	II.			Poultry 52,	3	Poultry 75,	5
Poultry Husbandry,	52 II.	3						Veterinary 86,	3
Poultry Husbandry,	53 III.	5							
Poultry Husbandry,	54 III.	2	III.			Poultry 53,	5		
Poultry Husbandry,	75 II.	5				Poultry 54,	2		
Poultry Husbandry,	76 I.	5				Animal Husbandry 51,	5		
Poultry Husbandry,	77 I.	5	IV.						
Pomology,	50 I.	3							
Veterinary Science,	86 II.	3							
		44							

Sophomore Recommendations. — Students intending to major in Poultry Husbandry are urged to take Zoölogy 27.

Advised. — Juniors who did not take Zoölogy 27 as sophomores are strongly advised to include it in their program.

Floriculture.

Associate Professor Arno H. Nehrling, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 I.	2	I.	Drawing 25,	3	Floriculture 50,	4	Floriculture 75,	3
Botany,	51 II.	2				Floriculture 53,	3	Horticulture 50,	5
Entomology,	26 II.	3				Botany 50,	2		
Floriculture,	50 I.	4	II.	Drawing 26,	3	Floriculture 51,	4	Floriculture 77,	3
Floriculture,	51 II.	4		Entomology 26,	3	Floriculture 54,	3	Floriculture 76,	3
Floriculture,	52 III.	4		Botany 26,	3	Entomology 26,	5		
						Botany 51,	2		
Floriculture,	53 I.	3	III.	Drawing 27,	3	Floriculture 52,	4	Floriculture 80,	3
Floriculture,	54 II.	3		Entomology 27,	2	Floriculture 78,	3	Horticulture 51,	5
Floriculture,	75 I.	3		Horticulture 27,	3				
Floriculture,	76 II.	3							
Floriculture,	77 II.	3	IV.						
Floriculture,	78 III.	3							
Floriculture,	80 III.	3							
Horticulture,	50 I.	5							
Horticulture,	51 III.	5							
		50							

Sophomore Elective Prerequisites. — Drawing 25, 26 and 27, Entomology 26 and 27, Botany 26 and Horticulture 27.

Additional Information. — The rest of the sophomore electives allowed are left to the student to choose. Horticulture 50 and 51 will be taken by seniors.

Advised. — The department advises all students who major in this subject to take Botany 78 and Landscape Gardening 75.

Forestry. (Major.)

Professor William D. Clark, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 **I.**	2	**I.**	Drawing 25,	3	Forestry 50,	3	Forestry 75,	5
Botany,	50 **II.**	2		Rural Engineering 25,	2	Landscape Gardening 50,	5		
Entomology,	75 **III.**	4				Horticulture 50,	5		
						Botany 50,	2		
Forestry,	50 **I.**	3	**II.**	Drawing 26,	3	Forestry 51,	3		
Forestry,	51 **II.**	3		Mathematics 26,	2	Botany 51,	2		
Forestry,	53 **III.**	3		Entomology 26,	3	Landscape Gardening 51,	4		
Forestry,	54 **IV.**	5		Botany 26,	3				
Forestry,	75 **I.**	5	**III.**	Drawing 27,	3	Forestry 53,	3	Forestry 78,	3
Forestry,	78 **III.**	3		Mathematics 27,	2	Horticulture 51,	5		
Horticulture,	50 **I.**	5		Entomology 27,	3	Entomology 75,	4		
				Horticulture 27,	3				
Horticulture,	51 **III.**	5	**IV.**			Landscape Gardening 53,	5		
Landscape Gardening,	50 **I.**	5				Forestry 54,	5		
Landscape Gardening,	51 **II.**	4							
		49							

Sophomore Elective Prerequisites (Required). — Drawing 25, 26 and 27, Rural Engineering 25, Mathematics 26 and 27, Entomology 26 and 27, Botany 26, Horticulture 27.

Additional Information. — Substitutions according to individual needs may be made in conference with the adviser.

Landscape Gardening. (Major.)

Professor Frank A. Waugh, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Horticulture,	50 I.	5	I.	Drawing 25,	3	Landscape Gardening 50,	5	Landscape Gardening 75,	3
Horticulture,	51 III.	5				Horticulture 50,	5		
Landscape Gardening,	50 I.	5				Drawing 25,	3		
Landscape Gardening,	51 II.	4	II.	Drawing 26,	3	Landscape Gardening 51,	4	Landscape Gardening 76,	
Landscape Gardening,	52 III.	5		Mathematics 26,	2	Drawing 26,	3		
Landscape Gardening,	53 IV.	5		Entomology 26,	3				
Landscape Gardening,	75 I.	3	III.	Drawing 27,	3	Landscape Gardening 52,	5	Landscape Gardening 78 or 79,	3
Landscape Gardening,	76 II.	4		Mathematics 27,	3	Horticulture 51,	5	Landscape Gardening 77,	4
Landscape Gardening,	77 III.	4		Horticulture 27,	3	Drawing 27,	3		
						Landscape Gardening 78 or 79,	3		
Landscape Gardening, or	78 III.	3	IV.			Landscape Gardening 53,	5		
Landscape Gardening,	79 III.	3							
		46							

Sophomore Elective Prerequisites (Required). — Drawing 25, 26 and 27, Mathematics 26 and 27, Horticulture 27.

Additional Information. — Modifications may be permitted when they appear advisable.

Pomology. (Major.)

Professor Fred C. Sears, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	77 **II.**	5	**I.**	Rural Engineering 25,	2	Pomology 50,	3	Pomology 75,	3
Rural Engineering,	76 **I.**	5				Rural Engineering 76,	5	Pomology 77,	5
								Agronomy 75,	5
Entomology,	26 **II.**	3	**II.**	Botany 26,	3	Pomology 51,	3	Pomology 76,	3
Entomology,	27 **III.**	2		Rural Engineering 26,	2	Entomology 26,	5	Agronomy 77,	5
Pomology,	50 **I.**	3		Entomology 26,	3				
Pomology,	51 **II.**	3	**III.**	Horticulture 27,	3	Pomology 52,	3	Pomology 78,	3
Pomology,	52 **III.**	3		Entomology 27,	2	Entomology 27,	3		
Pomology,	75 **I.**	3							
Pomology,	76 **II.**	3	**IV.**			Pomology 53,	5		
Pomology,	77 **I.**	5							
Pomology,	78 **III.**	3							
		38							

Sophomore Elective Prerequisites (Required). — Horticulture 27, Entomology 26 and 27.

Advised. — Rural Engineering 25 and 26, Botany 50.

Additional Information. — The rest of the sophomore electives allowed are left to the student to choose.

Economic Botany. (Major.)

Professor A. Vincent Osmun, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	52 I.	3	I.	Chemistry 25,	3	Botany 52,	3	Botany 75,	5
Botany,	53 II.	3		German 25 or 28,	3	Botany 55,	3	Botany 78,	5
Botany,	54 III.	3				Chemistry 51,	8	Botany 86,	1
Botany,	55 I.	3							
Botany,	56 II.	3							
Botany,	75 I.	5	II.	Chemistry 26,	3	Botany 53,	3	Botany 76,	5
Botany,	76 II.	5		German 26 or 29,	3	Botany 56,	3	Botany 79,	5
Botany,	77 III.	5		Botany 26,	3			Botany 82,	3
Botany,	78 I.	5						Botany 87,	1
Botany,	79 II.	5							
Botany,	80 III.	5							
Botany,	82 II.	3	III.	German 27 or 30,	3	Botany 54,	3	Botany 77,	5
Botany,	83 III.	3						Botany 80,	5
Botany,	86 I.	1						Botany 83,	3
Botany,	87 II.	1						Botany 88,	1
Botany,	88 III.	1							
Chemistry,	51 I.	8							
		62							
			IV.						

Sophomore Elective Prerequisites (Required). —German 25 or 28, 26 or 29, 27 or 30, Botany 26.

Advised. — Chemistry 25 and 26.

Additional Information. — The balance of the sophomore electives allowed are left to the student to choose. Selection of 45 credits of the above (Pathology 75, 76 and 77, Physiology 78, 79 and 80).

Agricultural Chemistry. (Major.)

Professor Charles A. Peters, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry,	51 **I.**	8	**I.**	Chemistry 25,	3	Chemistry 51,	8	Chemistry 76,	5
Chemistry,	52 **II.**	8		German 25 or 28,	3	Chemistry 60,	3	Chemistry 80,	5
Chemistry,	60 **I.**	3							
Chemistry,	61 **II.**	3[1]							
Chemistry,	62 **III.**	5							
Chemistry,	65 **III.**	5	**II.**	Chemistry 26,	3	Chemistry 52,	8	Chemistry 77,	3
Chemistry,	76 **I.**	5		German 26 or 29,	3	Chemistry 61,	3[1]	Chemistry 90, 92, 94,	3[2]
Chemistry,	77 **II.**	3		Entomology 26,	3				
Chemistry,	80 **I.**	5							
Chemistry,	87 **III.**	3							
Chemistry,	90 **II.**	3[2]							
Chemistry,	92 **II.**								
Chemistry,	94 **II.**								
Chemistry,	91 **III.**	5	**III.**	Chemistry 27,	5	Chemistry 62,	5	Chemistry 91, 93, 95,	5
Chemistry,	93 **II.**			German 27 or 30,	3	Chemistry 65,	5	Chemistry 87,	3
Chemistry,	95 **III.**			Entomology 27,	2				
		54[3]	**IV.**						

Sophomore Elective Prerequisites (Required). — Chemistry 25, 26 and 27.

Advised. — German 25 or 28, 26 or 29, 27 or 30, Entomology 26 and 27.

Additional Information. — The balance of the sophomore electives allowed are left for the student to choose.

[1] Course 61 is given as a 5-credit course in 1916-17.

[2] Courses 90, 92, 94 may be changed from 3 credits to an option of 3 or 5 credits in 1917-18.

[3] To get the allowed 45 credits the student will select one of the following groups of courses: 90 and 91, or 92 and 93, or 94 and 95, together with the balance from courses shown above.

Economic Entomology. (Major.)

Professor Henry T. Fernald, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 **I.**	2	**I.**	French 25-28, or German 25-28,	3	Botany 50,	2	Entomology 76,	5
Botany,	51 **II.**	2				Zoölogy 50,	3		
Entomology,	50 **I.**	3				Entomology 50,	3		
Entomology,	51 **II.**	3		Chemistry 25,	3				
Entomology,	52 **III.**	3							
Entomology,	75 **III.**	4	**II.**	French 26-29, or German 26-29,	3	Zoölogy 51,	3	Entomology 77,	3
Entomology,	76 **I.**	5				Entomology 51,	3	Zoölogy 76,	3
Entomology,	77 **II.**	3				Botany 51,	2	Entomology 90,	3
				Entomology 26,	3	Chemistry 61,	3		
				Botany 26,	3				
Entomology,	78 **III.**	4	**III.**	French 27-30, or German 27-30,	3	Zoölogy 52,	3	Entomology 78,	4
Entomology,	90 **II.**	3				Entomology 52,	3	Entomology 75,	4
Zoölogy,	50 **I.**	3							
				Entomology 27,	2				
				Chemistry 27,	5				
Zoölogy,	51 **II.**	3	**IV.**						
Zoölogy,	52 **III.**	3							
Zoölogy,	54 **II.**	3							
		38							

Sophomore Elective Prerequisites (Required). — Entomology 26 and 27, Botany 26.

Advised. — French or German 25 or 28, 26 or 29, 27 or 30, Chemistry 25, 27 and 61.

Additional Information. — The balance of the sophomore electives allowed are left for the student to choose. Juniors are advised to take Entomology 60. In 1916-17 Entomology 26 and 27 will be taken by juniors as part of their major. Beginning 1917-18 the regular junior courses 50, 51 and 52 will be in operation.

Microbiology. (Major.)

Professor Charles E. Marshall, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry,	51 I.	8	I.	Chemistry 25,	3	Microbiology 50,	5	Microbiology 81,	5
Chemistry,	52 II.	8		German or French 25 or 28,	3	Microbiology 51,	5	Microbiology 82,	5
Microbiology,	50 I.					Chemistry 51,	8	Microbiology 83,	5
or		5							
Microbiology,	50 III.		II.	German or French 26 or 29,	3	Microbiology 51,	5	Microbiology 75,	5
Microbiology,	51 I.					Chemistry 52,	8	Microbiology 80,	5
or								Dairying 75,	5
Microbiology,	51 II.	5							
or			III.	Chemistry 27,	5	Microbiology 50,	5	Microbiology 76,	5
Microbiology,	51 III.			German or French 27 or 30,	3	Microbiology 51,	5		
Microbiology,	52 III.	5		Physics 27,	5	Microbiology 52,	5		
Microbiology,	81 I.								
or			IV.						
Microbiology,	82 I.	5							
or									
Microbiology,	83 I.								
Microbiology,	80 II.								
or									
Microbiology,	75 II.	5							
or									
Dairying,	75 I.								
		41							

Sophomore Elective (Recommendations). — German or French 25 or 28, 26 or 29, 27 or 30, Chemistry 25 and 27, and Physics 27.

Additional Information. — The rest of the sophomore electives allowed are left for the student to choose. Microbiology 51, fall term, will be taken by students who have had Microbiology 50 the preceding spring, and by those who are permitted to omit Microbiology 50.

Rural Journalism. (Major.)

Associate Professor Robert W. Neal, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Rural Journalism,	50 I.	3	I.			Journalism 50,	3	Journalism 77,	3
Rural Journalism,	51 II.	3				[Journalism 53,	3]	Journalism 80,	4(5)
						Agricultural Economics 51,	5		
Two out of three: —			II.	Economics and Sociology 26,	5				
[Rural Journalism,	53 I.	3]				Journalism 51,	3	Journalism 77,	3
Rural Journalism,	54 II.	3				Journalism 54,	3	Journalism 81,	4(5)
Rural Journalism,	55 III.	3				Economics and Sociology 51,	5		
Two out of three: —			III.			Journalism 55,	3	[Journalism 77,	3]
Rural Journalism,	77 I.	3						Journalism 82,	4(5)
Rural Journalism,	78 II.	3							
Rural Journalism,	79 III.	3							
All: —									
Rural Journalism,	80 I.	4(5)							
Rural Journalism,	81 II.	4(5)							
Rural Journalism,	82 III.	4(5)							
Agricultural Economics,	51 I.	5	IV.						
Economics and Sociology,	51 II.	5							
Courses to be individually prescribed for remainder of 45 hours.		5							
		45							

Sophomore Prerequisites. — All sophomore English; Economics and Sociology 26. II.

Sophomore Recommendations. — French or German 25 (28), 26 (29), 27 (30); Drawing 25. *For agricultural journalism especially:* Animal Husbandry 25, 26, Chemistry 30, Entomology 26, 27.

Advised. — French or German at least two years in college; at least two courses in literature; Music; Landscape 75, 78; Chemistry 87; Entomology 90; Microbiology 50; (Veterinary 78); Zoölogy 27; Geology 27; Agricultural Education 50, 53; Rural Sociology 50, 72; other courses in Economics and Sociology, Rural Sociology, Agricultural Economics, History and Government. *Especially for agricultural journalism:* Agronomy 50, 51; Animal Husbandry 51; Dairying 50 or 77; Farm Management 75 (76); Poultry 50; Rural Engineering 75, 76; Horticulture 27, 75; Forestry 52; Market Gardening 50; Pomology 53; Mathematics (75), 77; Veterinary 78; other courses in the economics and the sociology departments bearing on rural problems.

Agricultural Economics. (Major.)

Professor Alexander E. Cance, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics,	50 **I.**	5	**I.**			Agricultural Economics 50,	5	Agricultural Economics 75,	5
Agricultural Economics,	52 **II.**	5							
Agricultural Economics,	75 **I.**	5							
Agricultural Economics,	76 **II.**		**II.**			Agricultural Economics 52,	5	Agricultural Economics 76,	5
or		5				Rural Sociology 51,	3	Rural Sociology 78,	5
Agricultural Economics,	77 **III.**					Economic Sociology 51,	5		
Economic Sociology,	51 **II.**	5							
Economic Sociology,	52 **III.**	5	**III.**			Economic Sociology 52,	5	Farm Management 76,	5
Farm Management,	76 **III.**	5				Rural Sociology 52,	3	Agricultural Economics 77,	5
Rural Sociology,	51 **II.**	3							
Rural Sociology,	52 **III.**	3	**IV.**						
Rural Sociology,	78 **II.**	5							
		46							

Additional Information. — The sophomore electives are left to the student to choose.

Agricultural Education. (Major.)

Professor William R. Hart, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Education,	50 I.	5	I.			Botany 50,	2	Agronomy 75,	5
Agricultural Education,	51 II.	5				Agricultural Education 50,	5	Poultry 50,	3
Agricultural Education,	52 IV.	5				Agronomy 50,	5	Dairying 77,	5
						Pomology 50,	3		
Agricultural Education,	53 III.	5	II.			Agricultural Education 51,	5	Farm Management 75,	3
Agronomy,	50 I.	5				Botany 51,	2		
Agronomy,	75 I.	5							
Botany,	50 I.	2	III.			Market Gardening 50,	3		
Botany,	51 II.	2				Agricultural Education 53,	5		
Dairying,	77 I.	5							
Farm Management,	75 II.	3	IV.			Agricultural Education 52,	5		
Market Gardening,	50 III.	3							
Pomology,	50 I.	3							
Poultry Husbandry,	50 I.	3							
		51							

Additional Information. — The sophomore electives allowed are left to the student to choose.

Substitutions of other technical courses for some of those above mentioned may be made to meet the needs of individual students.

A selection is allowed of Poultry Husbandry 50 and Market Gardening 50, making 6 credits, or Agronomy 75, 5 credits, making the total credits 45 or 46.

Rural Sociology. (Major.)

Professor John Phelan, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics,	50 I.	5	I.			Agricultural Economics 50,	5	Rural Sociology 75,	3
Agricultural Economics,	52 II.	5				Rural Sociology 50,	3	Economics and Sociology 75,	5
Economics and Sociology,	51 II.	5							
Economics and Sociology,	75 I.	5							
Economic Sociology,	76 III.	5	II.			Rural Sociology 51,	3	Rural Sociology 77,	3
Rural Journalism,	55 III.	3				Agricultural Economics 52,	5	Rural Sociology 78,	5
						Agricultural Education 52,	5		
						Economic Sociology 51,	5		
Rural Sociology,	50 I.	3	III.			Rural Journalism 55,	3	Rural Sociology 75,	3
Rural Sociology,	52 III.	3				Rural Sociology 52,	3	Economic Sociology 76,	5
Rural Sociology,	51 II.	3							
Rural Sociology,	77 II.	3	IV.						
Rural Sociology,	75 I.								
or		3							
Rural Sociology,	75 III.								
Agricultural Education,	52 II.								
or		5							
Rural Sociology,	78 II.								
		48							

Additional Information. — The sophomore electives allowed are left to the student to choose.

Description of Courses.

DIVISION OF AGRICULTURE.

Professor Foord.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agronomy.

Assistant Professor Jones, Assistant Professor Abbott, Mr. Merkle, Mr. Cobb, Mr. Purington.

Required Course.

1. **I. and II.** Agronomy. — Freshman. Given as part of the freshman agriculture and horticulture. This course aims, by actual contact with the plants and their products, to make the student familiar with the most common farm crops of Massachusetts and their uses. The crops studied are maize, cereals, grasses, legumes, potatoes and root crops. Six weeks, part of class only, first term; balance of class, six weeks during the second term.

2 2-hour laboratory periods, credit, 1.

Assistant Professor Jones and Assistants.

27. **III.** Soils and Fertilizers. — Sophomores. A study of soils and their properties, soil management, methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments.

4 class hours. 1 2-hour laboratory period, credit, 5.

The Department.

Prerequisite, freshman required Chemistry.

Elective Courses.

50. **I.** Field and Forage Crops. — For juniors; seniors may elect. History, classification and production of maize and of those grasses, legumes, forage and root crops suited to New England conditions. The work includes lecture, laboratory and field study of these various crops.

2 class hours. 3 2-hour laboratory periods, credit, 5.

Assistant Professor Jones and the Department.

Prerequisites, Agronomy 27, Botany 3.

51. **III.** Advanced Field Crops. — For juniors; seniors may elect. A study of the cereals and the minor farm crops not considered in Course 50. Laboratory work includes a study of the quality of seeds and grains, the grading and judging of farm crop products and field work with such crops as are available, especially mowings and pastures.

3 class hours. 2 2-hour laboratory periods, credit 5.

Assistant Professor Jones and the Department.

Prerequisite, Agronomy 50.

75. **I.** Advanced Soils. — For seniors; juniors may elect. A field, lecture and laboratory course on soils and their adaptability to different uses. The field work consists of a detailed study of soil textures, natural and spontaneous vegetation and other factors which indicate the fertility and adaptation of the soil; followed by a laboratory study of the physical properties of the soils sampled.

2 class hours. 3 2-hour laboratory periods, credit 5.

———— and Mr. Merkle.

Prerequisite, Agronomy 27.

76. **III.** Drainage and Irrigation. — For seniors; juniors may elect. A field and lecture course on soil improvement by drainage and irrigation, with special reference to problems of this nature as faced by Massachusetts farmers.

2 class hours. 1 2-hour and 1 4-hour laboratory period, credit, 5.

The Department.

Prerequisites, Mathematics 26 and 27, Agronomy 27.

77. **II.** Manures and Fertilizers. — Seniors. An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Considerable attention is devoted to consideration of the experimental work which has been done, and which is now in progress. The laboratory work consists of a study of fertilizers, fertilizer mixtures, limes and water culture work.

4 class hours. 1 2-hour laboratory period, credit 5.

Assistant Professor Abbott.

Prerequisite, Agronomy 27.

78. **II.** Breeding of Field Crops. — Seniors. This course deals with the improvement, by selection and breeding, of the crops studied in Courses 50 and 51.

3 class hours.

Assistant Professor Jones.

Prerequisite, Agronomy 51.

Animal Husbandry.

Professor McNutt, Assistant Professor Quaife, Mr. Fish.

Required Course.

1. **I and II.** Animal Husbandry. — Freshman. Given as part of the freshman agriculture and horticulture. This course is outlined to give the student a greater appreciation of animal husbandry. Demonstrations will be given and judging will be done to familiarize the student with the various breeds and market classes. Six weeks, part of class only, first term; balance of class, six weeks during the second term.

2 2-hour laboratory periods, credit, 1.

Animal Husbandry Department.

Elective Courses.

25. **I.** Breeds and Types of Live Stock. — Sophomores. A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Textbook, Plumb's "Breeds and Types of Farm Animals."

2 lectures. 1 2-hour laboratory period, credit, 3.

Assistant Professor Quaife.

26. **II.** Breeds and Types of Live Stock. — Sophomores. Continuation of Course 25.

2 lectures. 1 2-hour laboratory period, credit, 3.

Assistant Professor Quaife.

Prerequisite, Animal Husbandry 25.

50. **II.** Live Stock Management. — For juniors; seniors may elect. The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, harnessing, casting and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work.

1 2-hour laboratory period, credit, 1.

Assistant Professor Quaife.

Prerequisites, Animal Husbandry 25 and 26.

51. **III.** Principles of Breeding. — For juniors; seniors may elect. This course is designed to familiarize the student with the problems that are involved in animal improvement; to acquaint him with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; DeVrie's theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live-stock improvement. "Genetics," by Herbert E. Walter. Supplementary reading.

3 class hours. Credit, 3.

Professor McNutt.

Prerequisite, Zoölogy 25.

52. **III.** Advanced Stock Judging. — For juniors; seniors may elect. This course is designed to equip animal husbandry students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits will be made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected from this class.

1 2-hour and 1 4-hour laboratory period, credit, 3.

Professor McNutt.

Prerequisite, Animal Husbandry 50.

75. **I.** Feeding and Management. — For seniors; juniors may elect. A study of the principles of animal nutrition; of the composition and qualities of feeding materials. Textbook, Henry's "Feeds and Feeding."
3 class hours. Credit, 3.
Assistant Professor Quaife.
Prerequisite, Chemistry 30 or 51.

76. **II.** Feeding and Management. — For seniors; juniors may elect. A study of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production. Textbook, Henry's "Feeds and Feeding."
3 class hours. Credit, 3.
Professor McNutt.
Prerequisite, Chemistry 30 or 51.

77. **III.** Feeding and Management. — For seniors; juniors may elect. A continuation of Courses 75 and 76, dealing in a similar manner with horses, sheep, beef cattle and swine.
3 class hours. Credit, 3.
Assistant Professor Quaife.
Prerequisite, Animal Husbandry 75.

78. **II.** Herd and Stud-book Study. — For seniors; juniors may elect. An advanced course in the study of the breeds of live stock, familiarizing the student with the detailed history of the breed, the most productive sires and dams of the various breeds, and the successful lines and methods of breeding.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor McNutt.
Prerequisite, Animal Husbandry 75.

80. **III.** Seminar. — For seniors majoring in animal husbandry only. Advanced study upon questions pertaining to live stock and live-stock production. Each student electing this work will choose some particular line of work in which he is specially interested, and will pursue study in this subject by reading, compilation and research. There will be no regular lecture period, but seminars will be held. A satisfactory report of the results must be presented in a thesis.
1 2-hour laboratory period, credit, 1.
Professor McNutt.

Dairying.

Professor Lockwood, Assistant Professor Jamison, Mr. Coons, Mr. Drain.

Elective Courses.

50. **I.** Milk and Milk Composition. — For juniors; seniors may elect. The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for

fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Assistant Professor JAMISON and the DEPARTMENT.

51. **III.** BUTTER MAKING. — For juniors; seniors may elect. A study of separators and cream separation; handling milk and cream for butter making; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof.

2 class hours. 2 3-hour laboratory periods, credit, 5.

Mr. COONS and the DEPARTMENT.

Prerequisite, Dairying 50.

75. **II.** MARKET MILK. — For seniors; juniors may elect. A study of market-milk conditions; extent and development of the business; supply and delivery; food value of milk and its uses as food; milk and its relation to the public health; proper methods for handling milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Professor LOCKWOOD and the DEPARTMENT.

Prerequisite, Dairying 50.

76. **III.** MILK PRODUCTS. — For seniors; juniors may elect. The manufacture of milk products other than butter, including cheddar cheese, soft and fancy cheese, ice cream, condensed milk, casein, milk powder, etc. Laboratories, largely the making of soft and fancy cheese and ice cream.

2 class hours. 2 3-hour laboratory periods, credit, 5.

Mr. DRAIN.

Prerequisite, Dairying 75.

77. **I.** DAIRYING. — For seniors; juniors may elect. A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary butter making; proper methods of handling milk and cream; and the relation of market milk to the public health.

3 lecture hours. 2 2-hour laboratory periods, credit, 5.

Mr. DRAIN and the DEPARTMENT.

Farm Management.

Professor FOORD, Mr. PEACOCK.

Elective Courses.

75. **II.** FARM COST ACCOUNTING. — For seniors; juniors may elect. A study of farm inventories, single-enterprise accounts, complete farm accounts, and farm records. Special emphasis is given to the interpretation of results and their application in the organization and management of the farm.

1 class hour. 2 2-hour laboratory periods, credit 3.

Professor FOORD, Mr. PEACOCK.

76. **III.** Farm Management. — For seniors; juniors may elect. The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Professor Foord.

Prerequisites, Agronomy 50, Animal Husbandry 25 and 26.

Poultry Husbandry.

Professor Graham, Dr. Goodale, Assistant Professor Payne, Mr. Rucker.

Required Course.

1. **I. and II.** Poultry Husbandry. — Freshman. Given as part of the freshman agriculture and horticulture. This course consists of a study of the characteristics of the most important breeds and varieties of poultry based upon the classification in the Standard of Perfection. This will embrace both standard and utility qualities. The work on comparison will be based on the key. A special score card will be used for utility judging. Attention will be given to the adaptation of the most popular varieties, to the more highly specialized lines of poultry culture, and to the part played by poultry in New England agriculture. Six weeks, part of class only, first term; balance of class, six weeks during the second term.

2 2-hour laboratory periods, credit, 1.

The Department.

Elective Courses.

50. **I.** Elements of Poultry Culture. — For juniors; seniors may elect. This course consists of a comprehensive study of opportunities in poultry culture, poultry-house construction, poultry-house equipment, feeds and feeding, winter-egg production, types and breeds of poultry.

3 class hours. Credit, 3.

Professor Graham, Assistant Professor Payne and Mr. Rucker.

51. **I.** Poultry Practice Work. — For juniors; seniors may elect. This is a practical laboratory course in poultry carpentry, caponizing, killing and picking; dressing and packing poultry; sorting and preparing eggs for market.

2 2-hour laboratory periods, credit, 2.

Assistant Professor Payne.

Prerequisite, must be accompanied by Poultry 50.

52. **II.** Elements of Poultry Culture. — For juniors; seniors may elect. This course treats the subjects of incubation, brooding, care of growing stock, breeding, market poultry, including capons, roasters and broilers, and diseases of poultry.

3 class hours. Credit, 3.

Assistant Professor Payne and Mr. Rucker.

Prerequisite, Poultry 50.

53. **III.** Incubation and Brooding. — For juniors; seniors may elect. In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg and the care of sitting hens. Laboratory time by arrangement.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Assistant Professor Payne.

Prerequisite, Poultry 52.

54. **III.** Pen Management. — For juniors; seniors may elect. This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls and profit and loss.
1 2-hour laboratory period, credit, 1.
Mr. Payne.

Prerequisite, Poultry 50.

55. **I., II. and III.** Investigational Work. — Seniors. This course is designed especially for students who are planning to do experiment station work. Students will be assigned specific problems to work out experimentally, or they may be required to assist in carrying on such work.
1 to 5 2-hour laboratory periods, credits, 1 to 5.
Dr. Goodale.

75. **II.** Poultry Management. — Seniors. A detailed study of large poultry farms and their equipment, such as bone cutters, feed cutters, cramming machines, etc.; the laying out and planning of poultry buildings of all kinds; mating of fowls. Attention to poultry diseases and investigation work carried on by experiment station is prominent. A few good poultry plants will be visited by the class for practical demonstrations.
5 class hours. Credit, 5.
Professor Graham.

Prerequisites, Poultry 53, 54, 76 and 77.

76. **I.** Advanced Poultry Judging. — Seniors. This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Mr. Rucker.

Prerequisite, Poultry 53.

77. **I.** Market Poultry and Poultry Products. — Seniors. This course includes the study of market classifications of poultry, eggs and feathers, the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Payne.

Prerequisites, Poultry 50, 51 and 52.

Rural Engineering.

Professor Gunness.

Elective Courses.

25. **I.** Carpentry. — For sophomores; juniors and seniors may elect. Practice in the use of tools by exercises in bench work, repair of farm equipment and farm building construction.

2 2-hour laboratory periods, credit, 2.
Rural Engineering Department.

26. **II.** Repair of Farm Equipment. — For sophomores; juniors and seniors may elect. Exercises in forge work, pipe fitting, soldering. Practice in the use of machinists' tools, such as file, cold chisel, drill press, taps and dies.

2 2-hour laboratory periods, credit, 2.
Rural Engineering Department.

75. **I.** Farm Structures. — For seniors; juniors may elect. Study of the strength, durability and cost of building materials; water supply; lighting and heating systems for the farm; drawing plans, writing specifications and estimating the cost of buildings; concrete construction as applied to foundations, silos, tanks, posts, floors and walks.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Gunness.

76. **I.** Farm Mechanics. — For seniors; juniors may elect. A general study of the farm equipment; farm buildings, their location, plan and arrangement; water supply; sewage disposal; lighting and heating systems; farm power and farm machinery. Course 76 has been planned for the benefit of those students who want a general course in farm mechanics but cannot spend the time to take the two courses 75 and 78.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Gunness.

77. **II.** Power Machinery. — For seniors; juniors may elect. Steam and gasoline engines, refrigerating machinery, electric motors and dynamos. Practice in pipe fitting, soldering, babbitting and fitting bearings, lacing belts and packing valves. Course 77 is intended primarily for dairy students, but would be valuable to any man who would expect to use engines, pumps or electrical machinery.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor Gunness.

78. **III.** Farm Machinery. — For seniors; juniors may elect. Study of the care and operation of tillage, seeding, harvesting, pumping and spraying machinery; steam and gas engines. Special attention will be given to the use of power on the small farm. Practice in the adjustment of the various machines, babbitting and fitting bearings, lining shafts and pulleys, lacing belts, splicing rope and packing valves.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor Gunness.

DIVISION OF HORTICULTURE.

Professor Waugh, Assistant Professor Thompson, Assistant Professor Wheeler.

[The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.]

Required Course.

1. **I. and II.** Horticulture. — Freshman (part of freshman agriculture and horticulture). A general introduction to horticulture; principally laboratory work, judging fruits, etc., in class and field. Six weeks with class divided between first and second terms.

2 2-hour laboratory periods, credit, 1.
Assistant Professor Wheeler.

Elective Courses (General).

27. **III.** Nursery Practice. — For sophomores; juniors and seniors may elect. This course treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Thompson.

50. **I.** Plant Materials. — For juniors; seniors may elect. This course aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thompson.

Prerequisite, Horticulture 27.

51. **III.** Plant Materials. — For juniors; seniors may elect. A continuation of Course 50, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thompson.

Prerequisite, Horticulture 50.

75. **I.** Plant Breeding. — For seniors and graduate students. [Not given in 1917-18.] This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students

are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Prerequisite, open only to students well prepared in agricultural or horticultural subjects.

Floriculture.

Associate Professor NEHRLING, Mr. WILDON.

Elective Courses.

50. **I.** GREENHOUSE MANAGEMENT. — For juniors; seniors may elect. This course is designed to familiarize students with the methods followed in the management of greenhouse crops. The students are instructed in the practical operations of watering, potting, fumigating, ventilating and in the methods of propagation of plants by seed and cuttings. They will also be expected to arrange their hours according to the needs of the work.

2 class hours. 1 4-hour laboratory period, credit, 4.

Associate Professor NEHRLING and Mr. WILDON.

Prerequisite, Horticulture 27.

51. **II.** GREENHOUSE MANAGEMENT. — For juniors; seniors may elect. Continuation of Course 50. In addition, work in the use of cut flowers and plants in decorative work, the arrangement of flowers in baskets, designs, vases, table and home decorations will be considered.

2 class hours. 1 4-hour laboratory period, credit, 4.

Associate Professor NEHRLING and Mr. WILDON.

Prerequisite, Floriculture 50.

52. **III.** GREENHOUSE MANAGEMENT. — For juniors; seniors may elect. A continuation of Courses 50 and 51.

2 class hours. 1 4-hour laboratory period, credit, 4.

Associate Professor NEHRLING and Mr. WILDON.

Prerequisite, Floriculture 51.

53. **I.** GREENHOUSE CONSTRUCTION. — For juniors; seniors may elect. The location, arrangement, construction, cost, heating and ventilating of greenhouse structures; also the drawing of plans and drafting of specifications for commercial houses and private ranges. Such practical work as glazing, the construction of concrete benches and cold frames will be included in this course.

2 class hours. 1 2-hour laboratory period, credit, 3.

Associate Professor NEHRLING and Mr. WILDON.

Prerequisite, should be taken with Floriculture 50.

54. **II.** GREENHOUSE CONSTRUCTION. — For juniors; seniors may elect. A continuation of Course 53.

2 class hours. 1 2-hour laboratory period, credit, 3.

Associate Professor NEHRLING and Mr. WILDON.

Prerequisite, Floriculture 53.

75. **I.** Commercial Floriculture. — Seniors. A detailed study will be made of the methods of culture for greenhouse plants and cut flowers for wholesale and retail markets. The care and marketing of all florists' crops will also be considered. Assigned readings on these topics.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Nehrling.

Prerequisite, Floriculture 52.

76. **III.** Commercial Floriculture. — Seniors. As stated under Course 75.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Nehrling.

Prerequisites, Floriculture 75 and 80.

77. **II.** Conservatory Work and Decorative Plants. — Seniors. A study of the tropical and subtropical foliage and flowering plants used in conservatory work. Their arrangement and care will also be considered. Assigned readings.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Nehrling.

Prerequisite, Floriculture 75.

78. **III.** Garden Flowers and Bedding Plants. — Juniors and seniors. This course aims to make the student familiar with those annuals, herbaceous perennials, bulbs and bedding plants used in landscape work. Their propagation, culture and uses will be considered. Assigned readings and field trips.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Nehrling and Mr. Wildon.

79. **III.** Seminar. — For seniors majoring in floriculture only. Advanced study of subjects pertaining to commercial floriculture or private garden work. All students electing this work will be assigned a specific problem, and will pursue study in these problems by reading and research. No regular lectures will be given, but seminars will be conducted each week. A satisfactory report of the results must be presented.

2 to 6 laboratory hours. Not to exceed 3 credits.
Associate Professor Nehrling.

80. **II.** Commercial Floriculture. — Seniors. As stated under Course 75.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Nehrling and Mr. Wildon.

Prerequisite, Floriculture 75.

Forestry.

Professor Clark.

Elective Courses.

50. **I.** Dendrology. — For juniors; seniors may elect. During the first part of the term frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Lectures, recitations, laboratories or field work at option of instructor.

3 2-hour laboratory periods, credit, 3.
Professor Clark.

51. **II.** Wood Technology. — For juniors; seniors may elect. A study of the commercial woods found in the lumber markets, methods of identification, uses, strength values, technical qualities, decay and methods of preservation.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Clark.

52. **III.** Principles of Forestry. — For juniors; seniors may elect A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Not required of students who propose to major in forestry.

2 class hours. Credit, 2.
Professor Clark.

53. **III.** Silviculture. — For juniors; seniors may elect. Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting.

1 class hour. 1 4-hour laboratory period, credit, 3.
Professor Clark.

Prerequisite, Forestry 50.

54. **IV.** Arboriculture. — For juniors; seniors may elect. A course dealing with problems of shade tree propagation, protection and repair; the choice and grouping of species; shade tree laws. Assigned readings.

120 hours' field work, credit, 5.
Professor Clark.

75. **I.** Forest Mensuration. — For seniors; juniors may elect. Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating.

3 class hours. 72 hours' field work, credit, 5.
Professor Clark.

78. **III.** Seminar — Report. — Seniors. This may involve research, laboratory or field work in the investigation of some subject, together with a

review of the literature relating to it and an original written report evidencing the results. Subject to be chosen in conference with Professor Clark.

6 laboratory hours, credit, 3.
Professor Clark.

Landscape Gardening.

Professor Waugh, Assistant Professor Harrison.

Elective Courses.

50. **I.** Elements of Landscape Gardening. — Juniors. Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Must be followed by Course 51.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.
Professor Waugh.

Prerequisites, Mathematics 25 and 26, Drawing 25, 26 and 27, Horticulture 27.

51. **II.** Elements of Landscape Gardening. — Juniors. As stated under Course 50.

3 3-hour laboratory periods, credit, 4.
Assistant Professor Harrison.

Prerequisite, Landscape Gardening 50.

52. **III.** General Design. — Juniors. Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports on individual problems. Must be followed by Course 53.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.
Assistant Professor Harrison.

Prerequisites, Landscape Gardening 50 and 51, and either plant materials (Horticulture 50 and 51) or advanced mathematics.

53. **IV.** (Summer.) General Design. — Juniors. As stated under Course 52.

120 laboratory hours, credit, 5.
Assistant Professor Harrison.

Prerequisite, Landscape Gardening 52.

75. **I.** Theory of Landscape Art. — For seniors and graduates. The general theory and applications of landscape study, including a brief history of the art.

3 class hours. Credit, 3.
Professor Waugh.

76. **II.** Civic Art. — Seniors. The principles and applications of modern civic art, including city planning, city improvement, village improvement and rural improvement, with special emphasis upon country planning. Must be followed by Course 77.

3 3-hour laboratory periods, credit, 4.
Professor Waugh.

Prerequisite, Landscape Gardening 53.

77. **III.** Civic Art. — Seniors. As stated under Course 76.
3 3-hour laboratory periods, credit, 4.
Professor Waugh.
Prerequisite, Landscape Gardening 76.

78. **III.** Architecture. — Alternating with Course 79; given in 1916-17. Juniors and seniors. The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing.
3 class hours. Credit, 3.
Assistant Professor Harrison.

79. **III.** Construction and Maintenance. — Alternating with Course 78; given in 1917-18. Juniors and seniors. Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc.
3 class hours. Credit, 3.
Assistant Professor Harrison.

Market Gardening.

Professor Tompson, Assistant Professor Thomson.

Elective Courses.

50. **III.** Elements of Market Gardening. — Juniors; seniors may elect. A study of the business of commercial vegetable growing to acquaint the student with the fundamental considerations of the business and a knowledge of the market-garden crops. The study of the crops will consist of classroom, laboratory and field work, dealing with propagation, cultivation and marketing. Text and reference books.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thomson.

75. **I.** Elements of Market Gardening. — Seniors. A continuation of Market Gardening 50. A systematic study of types, varieties and strains of the leading vegetable crops, as well as a study of the problems of farm planning, irrigation, crop rotation, spraying, storage and methods of marketing and seed production. Text and reference books. Occasional seminars. Laboratory and field work.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thomson.
Prerequisite, Market Gardening 50.

76. **II.** Greenhouse Vegetable Growing. — Seniors. A study of the production of vegetables under glass as a business, briefly considering economic reasons for its development, progress in methods and management and the present status of the industry. A study of vegetable-forcing house construction, heating and greenhouse management, as applied to the leading green-

house crops, lettuce, cucumbers and tomatoes, with proportionate time given to the crops of lesser importance. Text and reference books and periodicals. Greenhouse work in actual production and management is a part of this course, and the student must so arrange that he can give it adequate attention. Considerable seminar work.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor THOMSON.

Prerequisite, Market Gardening 75.

Pomology.

Professor SEARS, Associate Professor CHENOWETH.

Elective Courses.

50. **I.** PRACTICAL POMOLOGY. — For juniors; seniors may elect. A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery stock, pruning, culture of orchards, orchard fertilizers, cropping orchards, etc. Lectures, supplemented with text and reference books; field and laboratory exercises.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor SEARS.

Prerequisite, Horticulture 27.

51. **II.** PRACTICAL POMOLOGY. — For juniors; seniors may elect. As stated under Course 50.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor SEARS.

Prerequisite, Pomology 50.

52. **III.** PRACTICAL POMOLOGY. — For juniors; seniors may elect. As stated under Course 50.

2 class hours. 1 2-hour laboratory period.
Professor SEARS.

Prerequisite, Pomology 51.

53. **IV.** (Summer.) SMALL FRUITS. — For juniors; seniors may elect. The growing, harvesting, marketing and storing of small fruits, including currants, gooseberries and grapes, together with thinning, spraying, picking and marketing of tree fruits at the college orchards and in private commercial orchards.

120 laboratory hours, credit, 5.
Associate Professor CHENOWETH.

75. **I.** SYSTEMATIC POMOLOGY. — Seniors. A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Lectures, laboratory and field exercises.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor CHENOWETH.

Prerequisite, Pomology 52.

76. **II.** Systematic Pomology. — Seniors. As stated under Course 75.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Chenoweth.

Prerequisite, Pomology 75.

77. **I.** Commercial Pomology. — Seniors only, majoring in pomology. The picking, handling, storing and marketing of fruits, including a discussion of storage houses, fruit packages, methods of grading and packing, manufacturing, etc. Especial emphasis is placed upon laboratory and field work, where the student is given actual practice in the picking and packing of all the principal fruits, together with the manufacture of by-products.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Chenoweth.

Prerequisite, Pomology 52.

78. **III.** Spraying. — Seniors. A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small-fruit plantations.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Sears.

Prerequisite, Pomology 52.

79. **III.** General Pomology. — For seniors; juniors may elect. This course is planned to meet the needs of those students who cannot devote more than one term to the subject but who want a general knowledge of fruit growing. The work will consist of lectures and laboratory exercises on such topics as choosing the locations, kinds and varieties of fruits to grow, securing and setting the plants, care and cultivation, pruning, spraying, pests, harvesting and storing.
2 lectures. 1 2-hour laboratory period, credit, 3.
Associate Professor Chenoweth.

80. **I.** Seminar. — For seniors majoring in pomology. Advanced study of problems relating to the business of fruit growing. Each student will be assigned a major and a minor problem in lines of work in which he is particularly interested. He will pursue his studies both by reading and research, and the materials obtained will be worked into theses which will be presented to the seminar for discussion. Reports on minor problems will be taken up first. No lectures will be given, but seminar meetings will be held for one period each week.

Credit, 1.
Professor Sears and Associate Professor Chenoweth.

81. **II.** Seminar. — For seniors majoring in pomology. A continuation of Course 80. One seminar meeting each week.

Credit, 1.

Professor Sears and Associate Professor Chenoweth.

82. **III.** Seminar. — For seniors majoring in pomology. A continuation of Course 81. One seminar meeting each week.

Credit, 1.

Professor Sears and Associate Professor Chenoweth.

Drawing.

Mr. Root.

Elective Courses.

25. **I.** Free-hand Drawing. — For sophomores; juniors and seniors may elect. Lettering; free-hand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water-color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink.

3 2-hour laboratory periods, credit, 3.

Mr. Root.

26. **II.** Mechanical Drawing. — For sophomores; juniors and seniors may elect. Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry.

3 2-hour laboratory periods, credit, 3.

Mr. Root.

27. **III.** Mechanical Drawing. — For sophomores; juniors and seniors may elect. As stated under Course 26.

3 2-hour laboratory periods, credit, 3.

Mr. Root.

Prerequisite, Drawing 26.

DIVISION OF SCIENCE.

Botany.

Professor Osmun, Associate Professor Anderson, Assistant Professor Clark, Mr. McLaughlin, Mr. Martin, Mr. White, Mr. Mardfin.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Required Courses.

3. **III.** Morphology and Taxonomy of the Higher Plants (Phanerogamia). — Freshmen. Seeds and seedlings; types of leaves, stems, roots and flowers. Determination and naming of plants, using Gray's "New Manual of Botany." An herbarium of 75 species of plants is required of each student.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Osmun, Mr. McLaughlin, Mr. Martin, Mr. White, Mr. Mardfin.

25. **I.** Anatomy, Physiology and Ecology of the Higher Plants. — Sophomores. Structure, functions, metabolism and environmental relations of seed plants.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Osmun, Mr. McLaughlin, Mr. Martin, Mr. White, Mr. Mardfin.

Prerequisite, Botany 3.

Elective Courses.

26. **II.** Morphology and Taxonomy of the Lower Plants (Cryptogamia). — Sophomores. Systematic study of typical forms of bacteria, algae, fungi, lichens, mosses, ferns. (Courses 3, 25 and 26 constitute a general elementary course in botany, and are prerequisites of all subsequent work taken in the Department of Botany.)

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Osmun, Mr. McLaughlin, Mr. Martin, Mr. White, Mr. Mardfin.

Prerequisite, Botany 25.

50. **I.** Diseases of Crops. — For juniors; seniors may elect. Laboratory and recitations devoted to diseases of the special crops related to the student's major. Arranged in sections for students specializing in (1) agronomy or market gardening; (2) floriculture or landscape gardening; (3) forestry or pomology; (4) entomology. Students may take the laboratory work in one, two or three sections. The laboratory work for students in entomology is general, and includes the more important diseases studied in the other sections. The class is not sectioned for lectures, which are general.

1 class hour. 1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.

Mr. Martin, Mr. McLaughlin.

Prerequisite, Botany 26.

51. **II.** Diseases of Crops. — For juniors; seniors may elect. As stated under Course 50.
1 class hour. 1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.
Mr. Martin, Mr. McLaughlin.
Prerequisite, Botany 50.

52. **I.** Systematic Mycology. — For juniors; seniors may elect. Morphology and development of typical species representing the orders and families of fungi; practice in identification, collection and preservation of fungi; study of systems of classification; collateral reading. A prerequisite of the senior course in plant pathology, but open to all.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Anderson.
Prerequisite, Botany 26.

53. **II.** Systematic Mycology. — For juniors; seniors may elect. As stated under Course 52.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Anderson.
Prerequisite, Botany 52.

54. **III.** Systematic Mycology. — For juniors; seniors may elect. As stated under Course 52.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Anderson.
Prerequisite, Botany 53.

55. **I.** Plant Histology. — For juniors; seniors may elect. Comparative study of the tissues of plants; training in histological methods, including the use of precision microtomes, methods of killing, fixing, sectioning, staining and mounting; collateral reading and conferences. This course offers valuable training in preparation for further work in botany.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun, Mr. McLaughlin.
Prerequisite, Botany 26.

56. **II.** Plant Histology. — For juniors; seniors may elect. As stated under Course 55.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun, Mr. McLaughlin.
Prerequisite, Botany 55.

75. **I.** Plant Pathology. — Seniors. Comprehensive study of diseases of plants; training in laboratory methods and technique, including culture work and artificial inoculation of hosts; miscellaneous diagnosis; study of literature and representative life histories of pathogens. Prepares for civil service, experiment station and college work.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor Osmun and Associate Professor Anderson.
Prerequisite, Botany 54.

76. **II.** Plant Pathology. — Seniors. As stated under Course 75.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor Osmun and Associate Professor Anderson.
Prerequisite, Botany 75.

77. **III.** Plant Pathology. — Seniors. As stated under Course 75.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor Osmun and Associate Professor Anderson.
Prerequisite, Botany 76.

78. **I.** Plant Physiology. — Seniors. A general course dealing with such topics as absorption, nutrition, growth and movements of plants; training in laboratory methods and the use of apparatus; collateral reading.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Clark.
Prerequisites, Botany 26 and Chemistry 51.

79. **II.** Plant Physiology. — Seniors. As stated under Course 78.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Clark.
Prerequisite, Botany 78.

80. **III.** Plant Physiology. — Seniors. As stated under Course 78.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Clark.
Prerequisite, Botany 79.

82. **II.** Cytology and Embryology. — Seniors. Morphology and physiology of the cell; cell-division; embryonal development.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Mr. McLaughlin.
Prerequisites, Botany 26 and 55.

83. **III.** Cytology and Embryology. — Seniors. As stated under Course 82.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Mr. McLaughlin.
Prerequisite, Botany 82.

86. **I.** Seminar. — For seniors and graduate students. Presentation and discussion of important current botanical papers. A major requirement.
1 class hour. Credit, 1.
The Department.

87. **II.** Seminar. — For seniors and graduate students. As stated under Course 86.
1 class hour. Credit, 1.
The Department.

88. **III.** Seminar. — For seniors and graduate students. As stated under Course 86.
1 class hour or 2 laboratory hours. Credit, 1.
The Department.

General and Agricultural Chemistry.

Professor Lindsey, Professor Wellington, Professor Chamberlain, Professor Peters, Professor Anderson, Mr. Serex, Mr. Beebe, Mr. Kelly, Mr. MacNeil, Mr. Perry, Mr. A. L. Prince.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the other sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and intending to follow chemistry as a vocation are prepared for positions as instructors in high schools and colleges, in the agricultural experiment stations, the United States Department of Agriculture, as well as in fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take especially graduate work leading to the degree of Master of Science, and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.]

Required Courses.

1. **I.** General Chemistry. — Freshmen. An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." This course is for those students who do not present chemistry for entrance, and who begin the subject in college.

2 class hours. 1 2-hour laboratory period, credit, 3.

Professor Peters, Mr. Serex, Mr. Beebe and Mr. Prince.

2. **II.** General Chemistry. — Freshmen. A continuation of Course 1. A study of metals and their compounds. The laboratory work is the same as described under Course 4.

2 class hours. 1 2-hour laboratory period, credit, 3.

Professor Peters and Assistants.

3. **III.** Inorganic Agricultural Chemistry. — Freshmen. As stated under Course 5 **II.**

2 class hours. 1 2-hour laboratory period, credit, 3.

Professor Anderson and Assistants.

4. **I.** Advanced General Chemistry. — Freshmen. A review of the fundamental chemical laws, together with the common acid and base-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate, superphosphate, muriate and sulfate of potash, arsenate of lead, Paris green, Bordeaux mixture, lime-sulfur and emulsions.

2 class hours. 1 2-hour laboratory period, credit, 3.

Professor Anderson and Assistants.

Prerequisite, Entrance Chemistry.

5. **II.** Inorganic Agricultural Chemistry. — Freshmen. A study of the chemical composition, properties and reactions of soils, fertilizers, fungicides and insecticides. The laboratory work is divided into three parts, as

follows: (*a*) qualitative examination of soil, plant ash and superphosphate; (*b*) approximate quantitative determination of moisture, ash, carbonic acid, phosphoric acid, potash, etc.; (*c*) special work on retention of salts by soil, leaching of lime from the soil by carbonated water, etc.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor ANDERSON and Assistants.

Prerequisite, Chemistry 3 or 4.

6. **III.** ORGANIC AGRICULTURAL CHEMISTRY. — Freshmen. As stated in Course 30.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor CHAMBERLAIN and Assistants.

Prerequisites, Chemistry 4 and 5.

Elective Courses.

25. **I.** QUALITATIVE ANALYSIS. — *Basic.* — Sophomores. A course in the systematic analysis of metallic salts, presented from the ionic viewpoint. The student studies closely the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Böttger's "Qualitative Analysis" and Treadwell-Hall's "Qualitative Analysis" for reference. This course should be taken, particularly, by all intending to follow chemistry as a vocation.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor ANDERSON and Mr. KELLY.

Prerequisite, Chemistry 3 or 6.

26. **II.** QUALITATIVE ANALYSIS. — *Acidic.* — Sophomores. A continuation of Course 25. A large part of the term is spent in the examination qualitatively of minerals and of agricultural products.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor ANDERSON and Mr. KELLY.

Prerequisite, Chemistry 25.

27. **III.** QUANTITATIVE ANALYSIS. — For sophomores; juniors and seniors may elect. Instruction in this course includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals. Talbot's "Quantitative Chemical Analysis" is used as a text.

1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor WELLINGTON, Professor PETERS and Mr. MACNEIL.

Prerequisite, Chemistry 25. Course 26 is prerequisite for those majoring in chemistry.

30. **III.** ORGANIC AGRICULTURAL CHEMISTRY. — For sophomores; juniors and seniors may elect. The course embraces the study of the most important groups of organic compounds of plants and animals, the composition of plants, the chemistry of plant growth, plants as food and as industrial material, the composition of animals, the chemistry of digestion, also the study of some of the products related to plants and animals, such as milk, butter, cheese, sugar, alcohol, wood pulp and paper. The treatment of the subject will be

general, avoiding (so far as possible) complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the general chemistry of plants and animals and agricultural processes and products.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor CHAMBERLAIN and Mr. PERRY.
Prerequisite, Chemistry 3 or 6.

51. **I.** ORGANIC CHEMISTRY. — For juniors; seniors may elect. This course is designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates, proteins, etc. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for future work in agricultural chemical investigation. Those electing Course 51 are expected to elect Course 52.
5 class hours. 2 3-hour laboratory periods, credit, 8.
Professor CHAMBERLAIN and Mr. PERRY.
Prerequisites, Chemistry 3 or 6, and Chemistry 27 for those majoring in chemistry.

52. **II.** ORGANIC CHEMISTRY. — For juniors; seniors may elect. As stated under Course 51.
5 class hours. 2 3-hour laboratory periods, credit, 8.

Prerequisite, Chemistry 51.

60. **I.** ADVANCED QUANTITATIVE CHEMISTRY. — For juniors; seniors may elect. Advanced work on subjects as stated under Course 27.
1 class hour. 1 4-hour laboratory period, credit, 3.
Professor WELLINGTON, Professor PETERS and Mr. MACNEIL.
Prerequisite, Chemistry 27.

61. **II.** INSECTICIDE ANALYSIS. — For juniors; seniors may elect. A study of methods for the analysis of insecticides. (For 1916–17 only, 2 4-hour laboratory periods, credit 5.)
1 class hour. 1 4-hour laboratory period, credit, 3.
Professor WELLINGTON, Professor PETERS and Mr. MACNEIL.
Prerequisite, Chemistry 27.

62. **III.** SOIL AND FERTILIZER ANALYSES. — For juniors; seniors may elect. A study of methods for analyses of soils and fertilizers.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor WELLINGTON, Professor PETERS and Mr. MACNEIL.
Prerequisite, Chemistry 27.

65. **III.** Physical Chemistry. — For juniors; seniors may elect. A résumé of general chemistry from the viewpoint of physical chemistry, and the application of physical chemistry to agricultural chemistry.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Anderson and Mr. Kelly.
Prerequisite, Chemistry 27.

76. **I.** Milk and Butter Analysis. — For seniors; juniors may elect. A study of chemical methods of analysis of milk and butter.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor Peters and Mr. MacNeil.
Prerequisite, Chemistry 27.

77. **II.** Cattle Feed, Water and Miscellaneous Analysis. — For seniors; juniors may elect. A study of methods of analysis of cattle feeds and water, with interpretations. Other materials may be analyzed.
1 class hour. 1 4-hour laboratory period, credit, 3.
Professor Peters and Mr. MacNeil.
Prerequisite, Chemistry 27.

80. **I.** Physiological Chemistry. — Seniors. This course is intended to be supplementary to Courses 51 and 52, and Course 30. To those who expect to take up scientific work in microbiology, botany, agronomy, animal husbandry, etc., and who have had Courses 51 and 52, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 51 and 52 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion. The course gives additional training in the chemical problems of agricultural experiment-station work, especially those connected with investigations in animal and plant nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Course 30.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Chamberlain and Mr. Perry.
Prerequisites, preferably Chemistry 30 or 51 and 52.

87. **III.** History of Chemistry. — Seniors. An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at greater length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course.
3 class hours. Credit, 3.
Professor Wellington.

90. **II.** Special Work in Agricultural Chemical Analysis. — Seniors. The student is given a problem to solve either in analytical chemistry or related to the agricultural industries. This is to acquaint him with the methods used in research and with the literature, and show him how to handle problems in this field of chemistry when occasion arises.

6 or 10 laboratory hours, credit, 3 or 5.
Professor Peters.

91. **III.** Special Work in Agricultural Chemical Analysis. — Seniors. As stated in Course 90.

10 laboratory hours, credit, 5.
Professor Peters.

Prerequisite, Chemistry 90.

92. **II.** Special Work in Physiological and Organic Agricultural Chemistry. — Seniors. In this course, as in Courses 90 to 94, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, the chemical study of dairy products, etc.

6 or 10 laboratory hours, credit, 3 or 5.
Professor Chamberlain.

Prerequisites, Chemistry 51, 52 and 80.

93. **III.** Special Work in Physiological and Organic Agricultural Chemistry. — Seniors. As stated under Course 92.

10 laboratory hours, credit, 5.
Professor Chamberlain.

Prerequisite, Chemistry 92.

94. **II.** Special Work in Physical Chemistry. — Seniors. The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student will select one line of work and follow it through the course, repeating some of the original work.

6 or 10 laboratory hours, credit, 3 or 5.
Professor Anderson.

Prerequisite, Chemistry 65.

95. **III.** Special Work in Physical Chemistry. — Seniors. As stated under Course 94.

10 laboratory hours, credit, 5.
Professor Anderson.

Prerequisite, Chemistry 94.

Entomology.

Professor Fernald, Professor Crampton, Associate Professor Gates, Dr. Regan.

Elective Courses.

26. **II.** 27. **III.** General and Economic Entomology. — For sophomores; juniors and seniors may elect. This is a general course in the study of insects intended for students in any line of work, and is directly continuous through two terms. It touches upon the structure of insects so far as this is needed for such a course; deals with metamorphosis, classification to the larger groups, and discusses the most important methods and materials used for control. The greater part of the time is devoted to special study of the most important insect pests, particularly of New England, showing their modes of life, the injuries they cause, and the best methods of control. In this way the most serious pests of fruit trees, ornamental trees and shrubs, market-garden and greenhouse pests, those attacking field crops and those affecting animals and man, are treated. During the winter term and in the spring term until about the first of May instruction is given by lectures and recitations; from about the first of May field work takes the place of the lectures. In this part of the course the students are shown how to find and recognize the work of the various insect pests which may be accessible at that season of the year, and they also make and preserve a collection of insects. 3 class hours. Credit, 3.

Professor Fernald.

27. **III.** General and Economic Entomology. — As stated under Course 26. **II.**

2 class hours till about May 1; thereafter 2 2-hour field periods. Credit, 2.

Professor Fernald, Professor Crampton, Dr. Regan.

50. **I.** A. Pests of Special Crops. — For juniors; seniors may elect. For students not majoring in entomology. The laboratory work is largely individual in this term. Accordingly, students majoring in subjects other than entomology, but who desire a more complete knowledge of the insects connected with their own major line of work, can obtain it here. A student majoring in floriculture, for example, will devote his laboratory time to a careful study of the insects injuring floricultural crops, learning how to recognize them and their work in their different stages, and the best methods for their control. Courses of this kind are available on the insects attacking field crops, market-garden crops, tree fruits, small fruits, shade trees and shrubs, flowers, forest trees, the domesticated animals and man. This work may be continued in the winter term also. (See 51., **II.**, A.)

50. **I.** B. Insect Morphology. — For juniors; seniors may elect. For students majoring in entomology. The lectures of this course treat of the external and internal anatomy of insects, particularly of those characters used in identification, a knowledge of which is needed in the accompanying laboratory work. In the laboratory the external anatomy of the most important groups is studied, followed by the identification of insects of these

groups, to show how the characters are made use of in learning the names of insects, and to teach the use of analytical keys.

2 class hours. 1 2-hour laboratory period, credit, 3.

Professor CRAMPTON, Professor FERNALD, Dr. REGAN.

Prerequisites, Entomology 26 and 27.

51. **II.** A. PESTS OF SPECIAL CROPS. — As stated in 50, **I.**, A.

51. **II.** B. INSECT CLASSIFICATION. — For juniors; seniors may elect. For students majoring in entomology. Systematic identification of insects of various groups. Study of various entomological publications and methods of finding the literature on any insect.

3 2-hour laboratory periods, credit, 3.

Professor FERNALD, Professor CRAMPTON, Dr. REGAN.

Prerequisite, Entomology 50, **I.**, B.

52. **III.** ECONOMIC ENTOMOLOGY. — For juniors; seniors may elect. Special studies on the most serious insect pests, their habits, nature of the injuries they cause and methods of control. In the lectures the composition, preparation and methods of application of the more important insecticides, their merits and defects, and studies of insecticide apparatus and other methods of control are treated. A portion of the laboratory time will be used in practical work on the topics taken up in the lectures.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor FERNALD, Professor CRAMPTON, Dr. REGAN.

Prerequisite, Entomology 51.

75. **III.** FOREST AND SHADE-TREE INSECTS. — For seniors; juniors may elect. A study of the insects injurious to forest and shade trees, and of methods for their control, with laboratory and field work on these insects, together with investigation of what is known about them.

1 class hour. 3 2-hour laboratory or field periods, credit, 4.

Dr. REGAN.

Prerequisites, Entomology 26 and 27; 50, B, desirable.

76. **I.** ADVANCED ENTOMOLOGY. — For seniors. During this year studies of scale insects (coccidology), life histories of important pests, the preparation of bibliographies, methods of rearing, photography of insects, methods for experimental work and record keeping, and studies of the early stages of insects will be given. Insects as disease carriers, insect bionomics, and a study of the animals not insects with which entomologists are expected to deal, will also be included in this course.

2 class hours. 3 2-hour laboratory periods, credit, 5.

Professor FERNALD, Professor CRAMPTON, Dr. REGAN.

Prerequisite, Entomology 52.

77. **II.** ADVANCED ENTOMOLOGY. — As stated in Course 76, **I.**

3 2-hour laboratory periods, credit, 3.

Prerequisite, Entomology 76.

78. **III.** Advanced Entomology. — As stated in Course 76, **I.**
1 class hour. 3 2-hour laboratory or field periods, credit, 4.
Prerequisite, Entomology 77.

90. **II.** Evolution. — For juniors; seniors may elect. In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the developmental history of man, and of the races of mankind, the evolution of human intelligence, languages, culture, institutions, etc., and man's probable future in the light of his past development. Especial consideration is given to the factors of evolution, the basic principles of heredity, sex-determination, variation and similar topics, with particular reference to their application to human welfare; and the recent contributions in the field of entomology to the advancement of our knowledge of these fundamental principles are briefly reviewed. The lectures are supplemented by collateral reading, and monthly seminars will be held for the purpose of demonstration and discussion by the class.
3 class hours. Credit, 3.
Professor Crampton.

Mathematics and Civil Engineering.

Professor Ostrander, Assistant Professor Duncan, Assistant Professor Machmer, Mr. Hazeltine.

Required Courses.

1. **I.** Higher Algebra. — Freshmen. A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra."
5 class hours. Credit, 5.
Assistant Professor Duncan, Assistant Professor Machmer and Mr. Hazeltine.

2. **II.** Higher Algebra. — As stated under Course 1.
2 class hours. Credit, 2.
Assistant Professor Duncan, Assistant Professor Machmer and Mr. Hazeltine.

3. **III.** Solid Geometry. — Freshmen. Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Required unless accepted for admission.
3 class hours. Credit, 3.
Assistant Professor Duncan, Assistant Professor Machmer and Mr. Hazeltine.

5. **II.** Plane Trigonometry (in charge of Department of Physics). — Freshmen. The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry."
3 class hours. Credit, 3.
Professor Hasbrouck and Assistant Professor Robbins.

6. **III.** Mensuration and Computation. — Freshmen. The course includes a review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule. Also the graph, mensuration of plane and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of woodworking; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements.
2 class hours. Credit, 2.
Assistant Professor Machmer, Assistant Professor Duncan and Mr. Hazeltine.

Elective Courses.

26. **II.** Plane Surveying. — For sophomores; juniors and seniors may elect. The elements of the subject, including the adjustment and use of the usual instruments. Textbook and lectures.
2 class hours. Credit, 2.
The Department.

27. **III.** Plane Surveying. — For sophomores; juniors and seniors may elect. As stated under Course 26. Includes field work.
3 2-hour laboratory periods, credit, 3.
The Department.
Prerequisite, Mathematics 26.

50. **I.** Analytic Geometry. — For juniors; seniors may elect. A discussion of the geometry of the line, the circle of conic sections and of the higher plane curves. Fine and Thompson's "Co-ordinate Geometry."
3 class hours. Credit, 3.
Assistant Professor Duncan.
Prerequisites, Mathematics 1, 2, 3 and 5.

51. **II.** Differential and Integral Calculus. — For juniors; seniors may elect. A first course in the subject, with some of the more important applications. Davis's "Differential and Integral Calculus."
5 class hours. Credit, 5.
Assistant Professor Duncan.
Prerequisites, Mathematics 1, 2, 3 and 5.

52. **III.** Integral Calculus. — For juniors; seniors may elect. A continuation of Course 51.
5 class hours. Credit, 5.
Assistant Professor Duncan.

Prerequisite, Mathematics 51.

53. **II.** Elementary Structures. — For juniors; seniors may elect. An elementary course in roofs and bridges. Textbook and lectures.
3 class hours. 1 2-hour laboratory period, credit, 4.
Professor Ostrander.

75. **I.** Hydraulics and Sanitary Engineering. — For seniors; juniors may elect. Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Textbook and lectures.
5 class hours. Credit, 5.
Professor Ostrander.

76. **I.** Materials of Construction, Foundations and Masonry Construction. — For seniors; juniors may elect. Textbook and lectures.
4 class hours. 1 2-hour laboratory period, credit, 5.
Professor Ostrander.

77. **II.** Roads and Railroads. — For seniors; juniors may elect. Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Textbook and lectures.
3 class hours. Credit, 3.
Professor Ostrander.

78. **III.** Roads and Railroads. — For seniors; juniors may elect. As stated under Course 77.
3 2-hour laboratory periods, credit, 3.
Professor Ostrander.

Prerequisite, Mathematics 77.

79. **I.** Applied Mechanics. — Seniors. A course in applied mechanics, based on the calculus, with problems. Textbooks and lectures.
5 class hours. Credit, 5.
Professor Ostrander.

Prerequisite, Mathematics 51.

Microbiology.

Professor Marshall, Associate Professor vanSuchtelen, Dr. Itano, Mr. Ray.

[Courses 50 and 51 are especially adapted to those who wish a general comprehensive, although elementary, survey of agricultural microbiology.]

Elective Courses.

50. **I. and III.** Introduction and General Microbiology. — For juniors; seniors may elect. A review of the field of microbiology as a whole, with special reference to hygienic microbiology, will constitute this course. It

will be taught by means of lectures, demonstrations and textbooks. Although desirable, it will not be required as a prerequisite to all courses that follow, and may be taken along with Course 51.

5 class hours. Credit, 5.

Professor MARSHALL.

51. **I., II. and III.** MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY. — For juniors; seniors may elect. Types of micro-organisms, technic of handling, methods of culture and functions of micro-organisms are considered. This course is elementary and fundamental to all applied and special microbiological studies, and therefore is made a prerequisite to all courses following. One hour will be scheduled.

10 laboratory hours, credit, 5.

Dr. ITANO and Mr. RAY.

52. **III.** ADVANCED MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY. — For juniors; seniors may elect. The purpose of this course is to prepare the student for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technic and methods of culture, together with a more extensive knowledge of micro-organisms and their functions. One hour will be scheduled.

10 laboratory hours, credit, 5.

Dr. ITANO and Mr. RAY.

Prerequisite, Microbiology 51.

75. **II.** AGRICULTURAL MICROBIOLOGY. — For seniors; juniors may elect. This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor MARSHALL, Associate Professor VANSUCHTELEN, or Dr. ITANO and Mr. RAY.

Prerequisite, Microbiology 51.

76. **III.** AGRICULTURAL MICROBIOLOGY. — For seniors; juniors may elect. As stated under Course 75. One hour will be scheuled.

10 laboratory hours, credit, 5.

Professor MARSHALL, Associate Professor VANSUCHTELEN, or Dr. ITANO and Mr. RAY.

Prerequisites, Microbiology 52 and 75.

80. **II.** SOIL MICROBIOLOGY. — For seniors; juniors may elect. Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the

production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention. One hour will be scheduled.

10 laboratory hours, credit, 5.

Associate Professor VANSUCHTELEN.

Prerequisite, Microbiology 51.

81. I. HYGIENIC MICROBIOLOGY. — For seniors; juniors may elect. An attempt will be made to select for this course certain material which should be the possession of every individual, and which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antisepsis and asepsis, will be treated. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor MARSHALL and — —, or Dr. ITANO and Mr. RAY.

Prerequisites, Microbiology 50 and 51.

82. I. DAIRY MICROBIOLOGY. — For seniors; juniors may elect. Special emphasis will be placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk; bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered.

10 laboratory hours, credit, 5.

Professor MARSHALL and Mr. ——.

Prerequisites, Microbiology 51, Dairying 51.

83. I. FOOD MICROBIOLOGY. — For seniors; juniors may elect. A study of food preservation by means of drying, canning, refrigerating and addition of chemicals will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased foods, will receive consideration. Contamination of food supplies by means of water, handling, exposure, diseased persons, etc., is of especial significance, and will be demonstrated by laboratory exercises. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor MARSHALL and Mr. ——.

Prerequisite, Microbiology 51.

Physics.

Professor Hasbrouck, Assistant Professor Robbins, Mr. Thompson.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

Required Courses.

25. **I.** General Physics. — Sophomores. Mechanics of solids and fluids. This course includes statics, with equilibrium of rigid bodies, work, energy and friction; kinetics, considering rectilinear motion and motion in a curved path; harmonic motion; rotation of rigid bodies, including kinematics of rotation; liquids and gases, with properties of fluids at rest and in motion; properties of matter and its internal forces, including elasticity, capillarity, surface tension.

3 class hours. 1 2-hour laboratory period, credit, 4.

Professor Hasbrouck, Assistant Professor Robbins, Mr. Thompson.

26. **II.** Electricity and Magnetism. — Sophomores. The work in electricity includes such subject-matter as magnetism, electrostatics, electric currents with their production, chemical, heating and mechanical effects; battery cells, measurement of voltage, current flow and resistance, motors and generators.

2 class hours. 1 2-hour laboratory period, credit, 3.

Assistant Professor Robbins and Mr. Thompson.

Elective Courses.

27. **III.** Heat and Light. — For sophomores; juniors and seniors may elect. Thermometry, expansion, colorimetry and specific heat, transmission of heat, changes of state, radiation and absorption. Wave theory of light, optical instruments, analysis of light, color, interference, diffraction, polarization.

4 class hours. 1 2-hour laboratory period, credit, 5.

Professor Hasbrouck, Assistant Professor Robbins and Mr. Thompson.

50. **I.** Electricity, Heat and Light. — For juniors; seniors may elect.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Assistant Professor Robbins.

Prerequisite, Physics 27.

51. **II.** Electricity, Heat and Light. — For juniors; seniors may elect. Continuation of Course 50.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Assistant Professor Robbins.

Prerequisite, Physics 50.

52. **III.** Electricity, Heat and Light. — For juniors; seniors may elect. Continuation of Courses 50 and 51.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Assistant Professor Robbins.

Prerequisite, Physics 51.

Veterinary Science.

Professor Paige, Associate Professor Gage.

[The courses in veterinary science have been arranged to meet the needs of students who propose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

50. **I.** Veterinary Hygiene and Stable Sanitation. — For juniors; seniors may elect. This course is intended to familiarize the student with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals.
5 class hours. Credit, 5.
Professor Paige.

51. **II.** General Veterinary Pathology, Materia Medica and Therapeutics. — For juniors; seniors may elect. In this course such fundamental and general pathological conditions are studied as inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in the diagnosis, prevention and treatment of disease. The course in pathology is followed by one in materia medica and therapeutics, dealing with the origin, preparation, pharmacology, pharmacy, administration and therapeutic use of the more common drugs. Poisonous plants and symptoms and treatment of plant poisoning are also considered.
5 class hours. Credit, 5.
Professor Paige.

75. **I.** Comparative (Veterinary) Anatomy. — For seniors; juniors may elect. The anatomy of the horse is studied in detail, and that of other farm animals compared with it where differences exist. This course is essential for those students wishing to elect Course 76.
5 class hours. Credit, 5.
Professor Paige.

76. **II.** Theory and Practice of Veterinary Medicine; General, Special and Operative Surgery. — For seniors; juniors may elect. A course intended to familiarize the student with the various medical and surgical diseases of the different species of farm animals. Particular attention is given to diagnosis and first-aid treatment. The student is taught the technic of simple surgical operations that can with safety be performed by the stock owner. Lectures, demonstrations and practice. This course should be taken in conjunction with Course 51.
5 class hours. Credit, 5.
Professor Paige.

Prerequisite, Veterinary 75.

78. **I.** Essentials of General Pathology. — For seniors; juniors may elect. This course is planned to introduce the student to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis will be considered in the laboratory. The various chemical and biological reactions and tests will be presented from the standpoint of pure science, showing applications of chemistry and biology. The course will serve to liberally educate and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work.

2 3-hour laboratory periods, credit, 3.

Associate Professor Gage.

79. **II.** Essentials of General Animal Pathology. — For seniors; juniors may elect. This is a continuation of Course 78, and is devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease will be considered.

2 3-hour laboratory periods, credit, 3.

Associate Professor Gage.

Prerequisite, Veterinary 78.

80. **III.** Essentials of General Animal Pathology. — For seniors; juniors may elect. As stated in Courses 78 and 79.

2 3-hour laboratory periods, credit, 3.

Associate Professor Gage.

Prerequisite, Veterinary 79.

85. **I.** Avian Pathology. — For seniors; juniors may elect. A course in poultry diseases. The object of this course is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. The work will consist of a systematic study of the diseases of the alimentary tract, liver and abdominal region, followed by a study of the diseases of the respiratory system, circulation and kidneys. The important disease-producing external and internal parasites will be considered; also diseases of the skin and reproductive organs. Lectures and demonstrations.

2 3-hour laboratory periods, credit, 3.

Associate Professor Gage.

86. **II.** Avian Pathology. — For seniors; juniors may elect. As stated under Course 85, also devoted to the study of some of the special diseases of poultry. Recent methods used in the control of these diseases will be considered and opportunity offered the student for demonstrating various disease processes by means of prepared slides. Lectures, demonstrations and laboratory work.

2 3-hour laboratory periods, credit, 3.

Associate Professor Gage.

Prerequisite, Veterinary 85.

87. **III.** Avian Pathology. — For seniors; juniors may elect. As stated under Courses 85 and 86.

2 3-hour laboratory periods, credit, 3.
Associate Professor Gage.

Prerequisite, Veterinary 86.

Zoölogy and Geology.

Associate Professor Gordon, Dr. Ball.

Zoölogy.

Required Courses.

25. **I.** General Zoloögy. — Sophomores. This course gives an outline of the underlying principles of zoölogy and an introduction to animal structure.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

Elective Courses.

27. **III.** Elements of Mammalian Anatomy. — For sophomores; juniors and seniors may elect. This course is offered as a preparation for work in histology, embryology, general vertebrate zoölogy, etc. It also deals briefly with the essentials of physiology. The course is open to prospective students in physiological chemistry, microbiology, animal husbandry, veterinary sciences, etc.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

Prerequisite, Zoölogy 25.

50. **I.** Synoptic Invertebrate Zoölogy. — For juniors; seniors may elect. This course gives a synopsis of the distinguishing characters of the different phyla and classes of invertebrates.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

Prerequisite, Zoölogy 25.

51. **II.** Synoptic Invertebrate Zoölogy. — For juniors; seniors may elect. Continuation of Course 50.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

Prerequisite, Zoölogy 50.

52. **III.** Synoptic Invertebrate Zoölogy. — For juniors; seniors may elect. Continuation of Courses 50 and 51.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

Prerequisite, Zoölogy 51.

53. **I.** Elements of Microscopic Technique. — For juniors; seniors may elect. This course gives methods of preparing material for microscopic examination.

3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisite, Zoölogy 25.

54. **II.** Elements of Histology. — For juniors; seniors may elect. This course involves preparation and study of normal animal tissues.

3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisites, Zoölogy 27 and 53.

55. **III.** Elements of Histology. — For juniors; seniors may elect. Continuation of Course 54.

3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisite, Zoölogy 54.

75. **I.** Special Zoölogy.[1] — Juniors, seniors, graduates, vocational students and others may ask, and in most cases may arrange, for special work in zoölogy. Such work as is desired in connection with an undergraduate major in another department, or in connection with a vocational course, should be formulated in consultation with officers having the major or vocational course in charge before the request for the work is made. For juniors, seniors and graduates who desire to extend their knowledge of zoölogy along more advanced or special lines, and who are adequately prepared, provision will gladly be made when possible. Work taken under this title may extend through the year, or may be for one term only.

1 class hour. 2 2-hour laboratory periods; hours by arrangement, credit, 3.
The Department.

Prerequisites, each case will be decided by itself.

76. **II.** Special Zoölogy. — As stated under Course 75.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

Prerequisites, each case will be decided by itself.

77. **III.** Special Zoölogy. — As stated under Course 75.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

Prerequisites, each case will be decided by itself.

[1] Those who desire work in zoölogy as a minor for the degree of master of science or for the degree of doctor of philosophy may elect certain courses offered to juniors or seniors, or may arrange for separate work. The graduate student who elects undergraduate courses must meet the requirements of the graduate standards of work and accomplishment.

Geology.

Required Courses.

2. **II.** Agricultural Geology. — Freshmen. The elements of geology in their application to agriculture.
2 class hours. Credit, 2.
Associate Professor Gordon.

Elective Courses.

27. **III.** General Geology. — For sophomores; juniors and seniors may elect. Rock-forming minerals; rock types; rock weathering; dynamical, structural and surface geology. Lectures, map and field work.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Associate Professor Gordon.

DIVISION OF THE HUMANITIES.

Professor Sprague.

Economics and Sociology.

Professor Sprague.

[The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.]

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Elective Courses.

26. **II.** Civilizations, Ancient and Modern. — For sophomores; others may elect. This course studies the evolutionary origin and history of man; characteristics of primitive man, departure from the animal status and beginnings of civilization; origin and development of industries, arts and sciences; the evolution of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern development; characteristic features of the leading civilizations and races of ancient and modern times; beneficial and dangerous factors in American life in view of the history of human civilization.
5 class hours. Credit, 5.
Professor Sprague.

50. **I.** Business and Industry. — For juniors and seniors. The forms, organization, administration and labor problems of business. This course is devoted to the following subjects: methods of organizing, financing and administering corporations and partnerships; forms of business administration, wholesaling, jobbing, retailing, advertising, credits and collections; systems of industrial remuneration for wage earners, co-operation and preserving industrial peace; problems concerned with protective legislation for workmen and employers, sweated industries, prison labor, child labor and industrial education.
5 class hours. Credit, 5.
Professor Sprague.

51. **II.** Introduction to Economic Principles and Problems. — For juniors. This course is devoted to the study of the following subjects: definitions of economic terms, such as wealth, capital, value, etc.; factors of production, exchange and consumption; principles of economic production, supply and demand, diminishing returns, division of labor, productive organization, concentration of capital and labor, trust and monopoly problems, public control of production and distribution; principles of exchange, theories of value, money and its problems; international trade, tariff and free trade theories, American merchant marine, reciprocity, and trade treaties; forms of income, wages, interest, rent, profits and the forces which govern them; principles of spending, economy, luxury, conservation of individual and national resources; principles and agencies for saving, investments, banks, building associations,

insurance of all kinds; schemes for social organization; socialism, communism, industrial democracy. Textbook and readings.
5 class hours. Credit, 5.
Professor SPRAGUE.

75. **I.** SOCIAL INSTITUTIONS AND SOCIAL REFORMS. — For seniors; juniors by permission. This course is devoted to the study of the social institutions, such as the family, the State, property, religions; and to such current problems as eugenics, race suicide, divorce, crime and delinquent classes, prison reform, prevention and treatment of dependents and defectives, poverty, its causes and preventions; constructive modern social reform movements for insurance of wage earners, protection of childhood, assurance of safety, health and play time for all classes. The correctional and charitable institutions of Massachusetts will be studied in considerable detail.
5 class hours. Credit, 5.
Professor SPRAGUE.

77. **III.** PUBLIC FINANCE, TAXATION, MONEY AND BANKING. — For seniors. This course studies systems and problems of taxation as they are found in Europe and America; objects for spending public revenue; public debts and methods of organizing them; systems of money and currency problems of America; types, methods and functions of banks; economic and financial crises and depressions in the United States; modern war finance. Readings and lectures.
5 class hours. Credit, 5.
Professor SPRAGUE.

History and Government.

Elective Courses.

50. **III.** GOVERNMENT. — For juniors; seniors may elect. This course will cover subjects as follows: forms and working methods of the governments of Great Britain, Germany, France, Russia, Switzerland, New Zealand and Canada; historic types and theories of government; forms and methods of Federal, State and local governments in America; progress and problems of democracy and new reform movements in organization and administration; new tendencies towards social legislation and extension of governmental control over broader interests of the people.
5 class hours. Credit, 5.
Professor SPRAGUE.

75. **II.** HISTORY OF NEW ENGLAND. — For seniors; juniors may elect. Treating New England as a geographical and political unit, this course aims to give a survey of its religious, social, economic and political history. The development of its institutions, the growth of its industries, the spread of its population to other sections of the country, its influence upon national character and politics are phases of the subject which will be discussed. Assigned readings and theses will be required.
3 class hours. Credits, 3.
Miss JEFFERSON.

Languages and Literature.

Professor Lewis, Associate Professor Neal, Associate Professor Ashley, Associate Professor Mackimmie, Assistant Professor Prince, Assistant Professor Patterson, Miss Goessmann, Mr. Harmount, Mr. Julian, Mr. Rand, Mr. Payne.

English.

Required Courses.

1. **I.** 2. **II.** 3. **III.** English. — Freshmen. Composition. Intended to teach straight thinking, sound structure, clear and correct expression. Lectures, recitations, theme writing and conferences. Textbooks: Canby and others, "English Composition in Theory and Practice;" Woolley's "Handbook of Composition."
3 class hours each term. Credit, 3 each term.
Assistant Professor Prince, Assistant Professor Patterson, Mr. Rand and Mr. Payne.

25. **I.** 26. **II.** 27. **III.** English. — Sophomores. A general reading course in English literature. Two class hours each term. Credit, 2 each term.
Professor Lewis and Miss Goessmann.

Elective Courses in English Language and Literature.

[The elective courses in English fall into two groups. Both groups are intended to increase the student's appreciation of literature as a means to enjoyment, education and spiritual growth. Group one (Courses 50, 51, 52, 53, 54 and 55) will, besides introducing the student to individual writers, emphasize the life and thought of the times, political, economic and social, in order that the student may realize literature a the expression of individual genius representing (by leading it or summarizing it) the thought and spirit of a period or a social unit. Group two (Courses 75, 77, 79 and 80) will tend more to emphasize form-characteristics, artistic quality or historical development of literary types, or individual great writers. Courses 50, 51, 55, 75, 79 and 80 are offered in 1916-17; Courses 52, 53, 54, 55, 77 and 80 are offered in 1915-16 and 1917-18.]

50. **I.** English Writers and Thought. — *Verse from* 1744 *to* 1832 (1916, 1918). — Alternates with Course 53 for juniors; seniors may elect. A course in history, appreciation and understanding. Some of the writers studied are Gray, Goldsmith, Burns, Coleridge, Wordsworth, Keats, Shelley, Scott and Byron.
3 class hours. Credit, 3.

51. **II.** English Writers and Thought. — Alternates with Course 54. *Nineteenth Century Verse* (1915, 1917). — Juniors; seniors may elect. In general conception this course is like Course 50. Tennyson, Browning, Mrs. Browning, Arnold, the Rossettis and Morris, Swinburne and Clough are the authors to be studied.
3 class hours. Credit, 3.
Professor Lewis.

57. **III.** English Writers and Thought. — For juniors; seniors may elect. As stated under Course 51.
2 class hours. Credit, 2.
Professor Lewis.

Prerequisite, English 51.

52. **III.** English Writers and Thought. — *From Milton to Pope* (1915–17). — For juniors; seniors may elect. A survey course that will emphasize the leading writers of the periods, including Bacon, Milton, Dryden, Addison and the essayists, Swift and Pope. Given every second year.
3 class hours. Credit, 3.

53. **I.** English Writers and Thought. — Alternating with Course 50. *Prose from* 1744 *to* 1832 (1915, 1917). — For juniors; seniors may elect. A course in English prose paralleling Course 51. Some of the writers studied are Johnson, Sterne, Goldsmith, Burke, Miss Burney, Coleridge, Landor, Lamb, DeQuincey and Hazlitt.
3 class hours. Credit, 3.

54. **III.** English Writers and Thought. — Alternating with Course 51. *Nineteenth Century Prose* (1916, 1918). — For juniors; seniors may elect. This course parallels Course 51. Among the writers discussed will be Macaulay, Carlyle, Ruskin, Newman and Arnold.
3 class hours. Credit, 3.
Professor Lewis.

58. **III.** English Writers and Thought. — For juniors; seniors may elect. As stated under Course 54.
2 class hours. Credit, 2.
Professor Lewis.

Prerequisite, English 54.

55. **II.** American Writers and Thought. — For juniors; seniors may elect. Intended to give a general survey of literature in America, especially in the nineteenth century, with an introduction to the work of the best known writers, and with especial attention to the relations between national life and history and national thought as expressed in literature. The usual authors — Irving, Cooper, Bryant, Poe, Longfellow, Emerson, Hawthorne, Whittier, Parkman, Lowell, Holmes, Whitman, Lanier — will be discussed, and attention will be given to southern and western authors. Present writers and tendencies will also receive some notice.
3 class hours. Credit, 3.
Assistant Professor Prince.

56. **III.** American Writers and Thought. — For juniors; seniors may elect. As stated under Course 55.
2 class hours. Credit, 2.
Assistant Professor Prince.

Prerequisite, English 55.

60. **I.** The Literature of Rural Life. — For juniors; seniors may elect. A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pur-

suits, together with those who have upheld as an ideal the development of a rural environment in cities.
3 class hours. Credit, 3.
Miss GOESSMANN.

61. **II.** THE LITERATURE OF RURAL LIFE. — For juniors; seniors may elect. As stated under Course 60.
2 class hours. Credit, 2.
Miss GOESSMANN.

Prerequisite, English 60.

75. **III.** PROSE FICTION. — Alternating with Course 77. *The Novel* (1916, 1918). — For seniors; juniors may elect. Readings, references, reports and classroom talks. The course is mainly informal. [Withheld 1916.]
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor NEAL.

77. **III.** PROSE FICTION. — Alternating with Course 75. *The Short Story* (1915, 1917). — For seniors; juniors may elect. Readings, references, reports and classroom talks. The course is mainly informal. General texts, Neal's "Short Stories in the Making" and "To-day's Short Stories Analyzed."
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor NEAL.

79. **II.** THE DRAMA. — For seniors; juniors may elect. A cursory survey of early English drama, its origin, forms and meaning, will be followed by a careful study of Shakespeare. Four of his plays will be analyzed in detail, and many others will be read and discussed.
3 class hours. Credit, 3.
Mr. RAND.

80. **III.** THE DRAMA. — For seniors; juniors may elect. The course will trace the development of modern drama, especial attention being given to plays by Congreve, Goldsmith, Sheridan, Robertson, Jones, Pinero, Fitch, Shaw, Moody and Ibsen.
2 class hours. Credit, 2.
Mr. RAND.

Prerequisite, English 79.

RURAL JOURNALISM.

[The courses in journalism emphasize rural journalism. They aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant the application of journalistic principles in getting and suitably presenting material adapted to the nonurban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. As practical work, members of the classes supply "The Bay State Ruralist," a feature page for the "Springfield Union," and the "New Bedford Standard." Cordial unofficial relations are maintained with the college paper, "The Massachusetts Collegian."]

Elective Courses.

50. **I.** FOUNDATIONS OF WRITING: EXPOSITION. — For juniors; seniors may elect. Advanced composition; planning expository thought; expository structure; specimens, including contemporary articles from farm and rural

life publications; some bulletin writing, including presentation of technical information for nontechnical readers.
3 class hours. Credit, 3.
Associate Professor NEAL.

51. **II.** FOUNDATIONS OF WRITING: NARRATION AND DESCRIPTION. — For juniors; seniors may elect. The fundamental elements of style, word-choice, diction, sentence form and paragraph types. Description of persons, places, objects, industries and productional processes, the temper and characteristic aspects of public gatherings, moods, behavior and character-sketching. Narration of incident, sustained action, events in series and the like, as in biography, dramatic situation, history and fiction.
3 class hours. Credit, 3.
Associate Professor NEAL, Mr. RAND.

52. **III.** FOUNDATIONS OF WRITING: MAGAZINE WRITING. — For seniors; juniors may elect. Study and writing of various forms of magazine and similar articles.
3 class hours or equivalent in laboratory. Credit, 3.
Associate Professor NEAL.
Prerequisite, one or more junior courses in journalism, or experience on college publications.

53. **I.** NEWS-GATHERING AND NEWS-WRITING. — For juniors; seniors may elect. The foundation aims and conceptions of journalism. Readings, lectures, quizzes and personal conferences; reporting on runs and on assignment; regular reading of a daily paper and of a weekly review or farm journal, with reports. Central purpose, to develop ability to pick out essentials from inessentials, perceive elements of interest, and present facts with appeal to the reader. This course and Courses 54 and 55 are suited to non-majoring students whose vocation will require the popular presentation of technical or other information; *e.g.*, extension workers, county agents, agricultural school instructors, experiment-station editors, survey and other social service workers, men engaged in sociological or economic investigations, landscape architects and civil and sanitary engineers.
6 laboratory hours, credit, 3.
Associate Professor NEAL.

54. **II.** NEWS-GATHERING AND NEWS-WRITING. — For juniors; seniors may elect. As outlined under Course 53, except that students who have taken Course 53 will be assigned different readings, and may be given a larger amount of reporting or other writing.
6 laboratory hours, credit, 3.
Associate Professor NEAL.

55. **III.** NEWS-GATHERING AND NEWS-WRITING. — For juniors; seniors may elect. As stated under Courses 53 and 54.
6 laboratory hours, credit, 3.
Associate Professor NEAL.

77. **I.** Editorial, Materials and Methods. — For seniors; juniors may elect. Readings, quizzes, reports and personal conferences; regular reading of one daily paper and one weekly review or rural life periodical; writing of editorial articles; current events or history. Recommended to nonmajoring students who desire practice in discovering the significant aspects of matters of public attention and in effectively expressing comment thereon.

6 laboratory hours, credit, 3.
Associate Professor Neal.

78. **II.** Editorial Materials and Methods. — For seniors; juniors may elect. As stated under Course 77.

6 laboratory hours, credit, 3.
Associate Professor Neal.

79. **III.** Editorial Materials and Methods. — For seniors; juniors may elect. As stated under Course 77.

6 laboratory hours, credit, 3.
Associate Professor Neal.

80. **I.** Advanced Journalistic Practice. — Seniors. Preparation, editing and publication of a rural life page or periodical.

8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

81. **II.** Advanced Journalistic Practice. — Seniors. As stated under Course 80.

8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

82. **III.** Advanced Journalistic Practice. — Seniors. As stated under Course 80.

8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

Public Speaking.

Required Courses.

1. **I.** 2. **II.** 3. **III.** Public Speaking. — Freshmen. Freshmen public speaking is required in the first, second or third term, at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Much attention, therefore, is given to the preparation and delivery of extempore speeches. Textbook, Robinson's "Effective Public Speaking," supplemented by class work and discussions. First, second or third terms, as directed.

1 class hour. Credit, 1.
Assistant Professor Prince, Assistant Professor Patterson, Mr. Rand.

Elective Courses.

50. **I.** Argumentation. — For juniors; seniors may elect. The course aims to present the fundamental principles of argumentation as applied to oral and written discourse, and intends to develop in the student power to

handle argument convincingly and persuasively. Lectures, discussions of leading questions of the day, practice in brief-drawing and the writing of forensics. Textbook, Foster's "Argumentation and Debating." The course is recommended for those who desire to enter the intercollegiate debates.
3 class hours. Credit, 3.
Assistant Professor PRINCE.

Prerequisite, Public Speaking 1, 2 or 3.

51. II. OCCASIONAL ORATORY. — For juniors; seniors may elect. The course involves a study of the elements of vocal expression and action; speeches on assigned subjects; prescribed reading; the preparation and delivery of several formal orations. Textbook, Shurter's "The Rhetoric of Oratory." The course is recommended for those who wish to enter the Flint contest.
3 class hours. Credit, 3.
Assistant Professor PRINCE.

Prerequisite, Public Speaking 1, 2 or 3.

French and Spanish.

Associate Professor MACKIMMIE, Mr. HARMOUNT.

FRENCH.

Required Courses.

1. I. 2. II. 3. III. ELEMENTARY FRENCH. — Freshmen; open upon arrangement to other students. The essentials of grammar are rapidly taught and will be accompanied by as much reading as possible. This course is required of freshmen presenting German for entrance who do not continue that language and have not studied French.
3 class hours each term. Credit, 3 each term.
Mr. HARMOUNT.

4. I. 5. II. 6. III. INTERMEDIATE FRENCH. — Freshmen; open upon arrangement to other students. Training for rapid reading. The reading of a number of short stories, novels and plays; composition, reports on collateral reading from periodicals and scientific texts in the library.
3 class hours each term. Credit, 3 each term.
Associate Professor MACKIMMIE, Mr. HARMOUNT.

Prerequisite, required of freshmen who present two years of French for entrance and do not take German.

Elective Courses.

25. I. INTERMEDIATE FRENCH. — For sophomores; open upon arrangement to other students. Training for rapid reading; the reading of a number of short stories, novels and plays; readings from periodicals and scientific texts in the library.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.

Prerequisites, French 1, 2 and 3.

26. **II.** Intermediate French. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisite, French 25.

27. **III.** Intermediate French. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisite, French 26.

28. **I.** Advanced French. — For sophomores; open upon arrangement to other students. A reading course. Balzac's "Eugénie Grandet" and "Le Père Goriot," and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports.
3 class hours. Credit, 3.
Mr. Harmount.
Prerequisites, French 4, 5 and 6.

29. **II.** Advanced French. — For sophomores; open upon arrangement to other students. As stated under Course 28.
3 class hours. Credit, 3.
Mr. Harmount.
Prerequisites, French 4, 5 and 6.

30. **III.** Advanced French. — For sophomores; open upon arrangement to other students. General view of the history of French literature; Kastner and Atkins' "History of French Literature." Representative works of the important periods will be studied in class. Outside reading will be required.
3 class hours. Credit, 3.
Mr. Harmount.
Prerequisites, French 25 and 26, or French 28 and 29.

50. **I.** Scientific French. — For juniors; seniors may elect. This course is planned to meet the requirements of the individual student, and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required, and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read.
3 class hours. Credit, 3.
Mr. Harmount.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

51. **II.** Scientific French. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Mr. Harmount.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

52. **III.** Scientific French. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Mr. Harmount.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

75. **I.** French Literature. — For seniors; juniors may elect. The object of Courses 75, 76 and 77 is to give an introduction to recent movements in French literature. Course 75 will deal with the drama, and plays by Augier, A. Dumas, fils, Delavigne and some contemporary dramatists will be read and studied.
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

76. **II.** French Literature. — For seniors; juniors may elect. This course deals with the novel. Works by Flaubert, the De Goncourts and Zola will be read. Written reports are required on outside reading.
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

77. **III.** French Literature. — For seniors; juniors may elect. Modern criticism. Sainte-Beuve, "Causeries de Lundi" (Harper) and works by Taine and Renan. Reference book, Lanson's "Histoire de la Litterature Française."
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

Spanish.

Elective Courses.

50. **I.** Elementary Spanish. — For juniors; seniors may elect. Open to other students upon arrangement. Grammar, with special drill in pronunciation; exercises in conversation and composition. Reading from a reader and selected short stories.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

51. **II.** Elementary Spanish. — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisite, Spanish 50.

52. **III.** Elementary Spanish. — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisite, Spanish 51.

75. **I.** Modern Spanish Authors. — Seniors. Reading from modern Spanish novel and drama. Translation of English into Spanish. Private reading.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, Spanish 52.

76. **II.** Modern Spanish Authors. — Seniors. As stated in Course 75.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, Spanish 75.

77. **III.** Modern Spanish Authors. — Seniors. As stated in Course 75.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, Spanish 76.

German and Music.

Associate Professor Ashley, Mr. Julian.

German.

Required Courses.

1. **I.** 2. **II.** 3. **III.** Elementary German. — Freshmen; open upon arrangement to other students. Grammar composition and reading. Especial attention is given to oral work in German and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German.
3 class hours, each term. Credit, 3 each term.
Associate Professor Ashley and Mr. Julian.

4. **I.** 5. **II.** 6. **III.** Intermediate German. — Freshmen; open upon arrangement to other students. Selected works of Schiller, Heine and Goethe. Grammar review and advanced prose composition.
3 class hours each term. Credit, 3 each term.
Associate Professor Ashley.

Prerequisite, required of freshmen who present two years of German for entrance and do not take French.

Elective Courses.

25. **I.** Intermediate German. — For sophomores; open upon arrangement to other students. Reading of such works as Sudermann's "Frau Sorge," "Wilhelm Tell," "Die Journalisten," etc. Grammar review.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisites, German 1, 2 and 3.

26. **II.** Intermediate German. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisite, German 25.

27. **III.** Intermediate German. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisite, German 26.

28. **I.** Advanced German. — For sophomores; open upon arrangement to other students. Reading and studying of Goethe's most important literature productions.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisites, German 4, 5 and 6.

29. **II.** Advanced German. — For sophomores; open upon arrangement to other students. Development of the German novel; rapid reading of great novelists.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 28.

30. **III.** Advanced German. — For sophomores; open upon arrangement to other students. As stated under Course 29.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 29.

Elective Courses.

50. **I.** Scientific German. — For juniors; seniors may elect. Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

51. **II.** Scientific German. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 50.

52. **III.** Scientific German. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 51.

75. **I.** German Literature. — Seniors. Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust" and one modern typical drama.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisites, German 28, 29 and 30.

76. **II.** German Literature. — Seniors. As stated under Course 75.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 75.

77. **III.** German Literature. — Seniors. As stated under Course 75.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 76.

78. **I.** Conversation and Composition. — For seniors; juniors may elect. Translating connected English into German. Reproducing outside readings in German orally in class.
1 class hour. Credit, 1.
Associate Professor Ashley.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

79. **II.** Conversation and Composition. — For seniors; juniors may elect. As stated under Course 78.
1 class hour. Credit, 1.
Associate Professor Ashley.

Prerequisite, German 78.

80. **III.** Conversation and Composition. — For seniors; juniors may elect. As stated under Course 78.
1 class hour. Credit, 1.
Associate Professor Ashley.

Prerequisite, German 79.

Music.

Elective Courses.

50. **I.** History and Interpretation of Music. — For juniors; seniors may elect. History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school, — Bach, Händel, Haydn, Gluck and Mozart.
1 class hour. Credit, 1.
Associate Professor Ashley.

51. **II.** History and Interpretation of Music. — For juniors; seniors may elect. A continuation of Course 50. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera.
1 class hour. Credit, 1.
Associate Professor Ashley.

52. **III.** History and Interpretation of Music. — For juniors; seniors may elect. The Modern school and Modern composers.
1 class hour. Credit, 1.
Associate Professor Ashley.

DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agricultural Economics.

Professor Cance and Mr. Rutledge.

Required Course.

26. **II.** Agricultural Industry and Resources. — Sophomores. A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions.
5 class hours. Credit, 5.
Professor Cance, Mr. Rutledge.

Elective Courses.

50. **I.** Elements of Agricultural Economics. — For juniors; seniors may elect. This course is designed to follow the required work in the elements of economics. It deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; principles of rural credit; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work.
5 class hours. Credit, 5.
Professor Cance.

51. **I.** Historical and Comparative Agriculture. — For juniors; seniors may elect. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Students in education and rural journalism should find this course helpful.
5 class hours. Credit, 5.
Mr. Rutledge.

52. **II.** Co-operation in Agriculture. — For juniors; seniors may elect. The course treats of the history, principles and business relations of agri-

cultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements; (2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, with particular reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises.

5 class hours. Credit, 5.

Professor CANCE.

75. **I.** THE AGRICULTURAL MARKET. — For seniors and graduate students; juniors may elect. A study of the forces and conditions which determine the prices of farm products and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market and direct sales are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work.

5 class hours. Credit, 5,

Professor CANCE.

76. **II.** TRANSPORTATION OF AGRICULTURAL PRODUCTS. — For seniors and graduate students; juniors may elect. This course deals with transportation in the United States, covering highways, waterways, railways and electric ways, with reference to the facilities for and cost of transporting farm products, opening up new agricultural areas or industries, and contributing to the wealth and welfare of the agricultural population. Lectures, text and field work.

5 class hours. Credit, 5.

Professor CANCE.

77. **III.** PROBLEMS IN AGRICULTURAL ECONOMICS. — For seniors and graduate students; juniors may elect. An advanced course for students desirous of studying more intensively some of the economic problems affecting the farmer. Some of these are: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems, — cost of producing farm products, farm labor in New England, immigration, agricultural credit. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest.

5 class hours. Credit, 5.

Professor CANCE.

80. **I.** SEMINAR. — For seniors and graduate students. Research in agricultural economics and history; problems of New England agriculture. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged.

1 2-hour laboratory period, credit, 1.

The DEPARTMENT.

81. **II.** Seminar. — For seniors and graduate students. As stated in Course 80.

1 2-hour laboratory period, credit, 1.
The Department.

82. **III.** Seminar. — For seniors and graduate students. As stated in Course 80.

1 2-hour laboratory period, credit, 1.
The Department.

Agricultural Education.

Professor Hart.

Elective Courses.

50. **I.** Meaning of Education (Psychology). — For juniors; seniors may elect. For teachers and others desiring an introduction to mental science. A study of the development, structure and functions of the nervous system and the sense organs; the development and nature of mental activities; the nature of the learning processes.

5 class hours. Credit, 5.
Professor Hart.

51. **II.** Rural School Problems. — For juniors; seniors may elect. Primarily for teachers. A study of agricultural education; the theory and practice of teaching; rural school organization; methods of instruction; the place and function of agriculture in the course of study for both rural and city schools; planning and practical work in school and home gardens; planning of equipment and ornamentation of rural school grounds.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor Hart.

52. **IV.** Rural School Problems. — For juniors; seniors may elect. As stated under Course 51.

120 laboratory hours, credit, 5.
Professor Hart.

53. **III.** History and Philosophy of Education. — For juniors; seniors may elect. For teachers and others desiring an introduction to educational theories. A study of educational ideals and movements as exemplified by leading nations and races; the growth of educational institutions as influenced by science and industry; the history and meaning of industrial and agricultural education.

5 class hours. Credit, 5.
Professor Hart.

75. **I.** Problems in Rural Education. — For seniors. For teachers or others interested in special phases of education, such as child development, physical and mental; school organization; rural schools; secondary schools; school programs; grading and promotion of pupils; school grounds and school

architecture and equipment; normal schools and the preparation of teachers; agricultural teaching and agricultural schools.
4 class hours. Credit, 4.
Professor HART.

76. **II.** PROBLEMS IN RURAL EDUCATION. — Seniors. As stated under Course 75.
4 class hours. Credit, 4.
Professor HART.

77. **II.** EXTENSION AND COUNTY AGENT WORK. — For seniors. The course consists chiefly of library research work. Each student will be required to produce one or more complete lectures under guidance both as to method of preparation and subject-matter, and one or more demonstrations. These lectures will be presented to public audiences in the presence of a board of critics. Some instruction will be given in organization and administration of the Extension Service. The Extension Service will be responsible for the public presentation and criticism. The student's major adviser will be responsible for the accuracy of the subject-matter. The Department of Agricultural Education will be responsible for the preparation of the lectures.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor HART.

78. **III.** EXTENSION AND COUNTY AGENT WORK. — For seniors. As stated under Course 77.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor HART.

Rural Sociology.

Professor PHELAN, President BUTTERFIELD, Professor HART, Mr. NOVITSKI.

Required Course.

27. **III.** ELEMENTS OF RURAL SOCIOLOGY. — Sophomores. A broad survey of the field of rural sociology, including such topics as the origin of rural sociology, its methods and problems; relation of sociological to the scientific and technical aspects of agricultural problems; the development of the rural community in New England and the west, religious, educational and social ideals of rural people; characteristics and influence of the rural environment, the movement of the rural population, the effects of immigration; rural institutions, the school, the church, local government, effects of modern conditions of life on rural institutions; rural organization; problems of progress, an analysis of the needs of rural life in its further development. Lectures, readings and essays on assigned topics.
3 class hours. Credit, 3.
Professor PHELAN, Mr. NOVITSKI.

Elective Courses.

50. **I.** SOCIAL CONDITION OF RURAL PEOPLE. — For juniors; seniors may elect. A. The rural status: composition of the rural population, nature, extent and causes of diseases and accidents, health agencies of control; extent

and causes of rural delinquency and dependency, conditions of temperance of sexual morality and family integrity; child labor, women's work and position; standard of living, size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics.

B. Rural social psychology: characteristics of the rural mind, character of hereditary and environmental influence; nature and effect of face-to-face groups; fashion, conventionality, custom, character of discussion and of public opinion.

3 class hours. Credit, 3.

Professor PHELAN.

51. **II.** RURAL GOVERNMENT. — For juniors; seniors may elect. A general survey of the development of rural government in the United States; origin of the New England town, its influence upon the west, advantages, development of efficiency, county government, the influence of the farmer in legislation, good roads movement, credit, facilities, taxation, boards of agriculture, agricultural colleges and experiment stations in relation to rural welfare; national government; a general survey of political organizations and movements among farmers in the United States and foreign countries and their influence in shaping legislation; relation of the Department of Agriculture, postal system, the various national commissions and agencies to rural welfare. Lectures, readings, written exercises on assigned topics.

3 class hours. Credit, 3.

Professor PHELAN, Mr. NOVITSKI.

52. **III.** RURAL ORGANIZATION. — For juniors; seniors may elect. A study of the organized agencies by which rural communities carry on their various forms of associated life, particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment; principles underlying leadership, qualifications of the paid leader and the lay leader; the field of rural social service, national, State and local, preparation and opportunity for service; rural community building, a study of organized ways and means by which aid is given local communities.

3 class hours. Credit, 3.

President BUTTERFIELD.

75. **I. and III.** FARMERS' ORGANIZATIONS. — For seniors; juniors may elect. The history, purposes and achievements of the grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; the method, scope and history of local, State and national associations formed about some farm product, their influence in forming class consciousness and in shaping agrarian legislation; need of federation. Lectures, readings and essays on assigned topics.

3 class hours. Credit, 3.

Professor PHELAN.

76. **I.** FIELD WORK IN RURAL SOCIOLOGY. — For seniors; juniors may elect. This course is designed to meet the needs of students who wish to do some constructive work in rural social service while still in college. The work will be carried on in co-operation with the various college agencies engaged in

rural service. Any project for which credit in this course is to be asked must first have the approval of the head of the department.

From 2 to 6 laboratory hours, credits, 1 to 3.
Professor PHELAN.

Prerequisites, Rural Sociology 27 and 52.

77. **II.** RURAL SOCIAL SURVEYS. — For seniors; juniors may elect. A careful study of the theory and function of statistics, the limitations and difficulties in the use of statistics, the interpretation of statistical data, various methods of graphic representation; a study of surveys, kinds and use, method of gaining information, the basis for conclusions, value of information gained. Text and lectures.

3 class hours. Credit, 3.
Professor PHELAN.

78. **II.** RURAL AND BUSINESS LAW. — For seniors; juniors may elect. The work of this course will cover such points as land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures and class discussions.

5 class hours. Credit, 5.
Professor HART.

79. **I.** SEMINAR. — Credits, 1 to 3. Professor PHELAN.

80. **II.** SEMINAR. — Credits, 1 to 3. Professor PHELAN.

81. **III.** SEMINAR. — Credits, 1 to 3. Professor PHELAN.

GENERAL DEPARTMENTS.

Military Science and Tactics.

Capt. H. W. Fleet, Infantry, U. S. A.; Adjutant: Ordnance Sergeant J. J. Lee, U. S. A., retired; Assistant: Quartermaster Sergeant Alex. Smart, U. S. A., retired.

[Owing to the approaching establishment of the Reserve Officers Training Corps, a revision of the statement of work in this department is necessary. It will appear in the spring supplement. The present statement is effective for the college year 1916-17.

The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-year course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical courses (drill) in military science are given in the first and third terms; the corresponding courses in physical education in the second term.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

The required uniform is of olive drab cloth, costing about $17. It is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $17 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74 inclusive, juniors; 75 to 99, inclusive, seniors.]

Required Courses.

1. **I.** Tactics. — Freshmen. Theoretical instruction in infantry drill regulations through the battalion and ceremonies. Lectures on military subjects and military history.

1 class hour. Credit, 1.

Captain Fleet.

3. **III.** Tactics. — Freshmen. As stated under Course 1.

1 class hour. Credit, 1.

Captain Fleet.

4. **I.** Drill. — Freshmen. Practical instruction in infantry drill regulations through the battalion. Ceremonies.

3 laboratory hours, credit, 1.
Captain Fleet.

6. **III.** Drill. — Freshmen. As stated under Course 4. Company training in bayonet exercises and physical exercises with and without arms.

3 laboratory hours, credit, 1.
Captain Fleet.

25. **I.** Tactics. — Sophomores. Theoretical instruction in map problems in security and information. Combat. Lectures on military subjects and military history.

1 class hour. Credit, 1.
Captain Fleet.

27. **III.** Tactics. — Sophomores. As stated under Course 25.

1 class hour. Credit, 1.
Captain Fleet.

28. **I.** Drill. — Sophomores. Practical instruction in field service regulations in the service of security and information. Corporals are appointed from this class.

3 laboratory hours, credit, 1.
Captain Fleet.

30. **III.** Drill. — Sophomores. As stated under Course 28; intrenching, combat.

3 laboratory hours, credit, 1.
Captain Fleet.

50. **I.** Military Science. — Juniors. Theoretical instruction in the small-arms firing regulations, in fire discipline, fire control and fire direction.

1 class hour. Credit, 1.
Captain Fleet.

52. **III.** Military Science. — Juniors. As stated in Course 50.

1 class hour. Credit, 1.
Captain Fleet.

53. **I.** Drill. — Juniors. Practical instruction in the small-arms firing regulations in target practice, estimating distances and field firing. Lieutenants and sergeants are appointed from this class.

3 laboratory hours, credit, 1.
Captain Fleet.

55. **III.** Drill. — Juniors. As stated under Course 53.

3 laboratory hours, credit, 1.
Captain Fleet.

Elective Courses.

75. **I.** Military Science. — Seniors. Theoretical instruction in infantry drill regulations, field service regulations, and small-arms firing regulations for company, battalion and regiment.
1 class hour. Credit, 1.
Captain Fleet.

77. **III.** Military Science. — Seniors. As stated under Course 75.
1 class hour. Credit, 1.
Captain Fleet.

78. **I.** Drill. — Seniors. Conduct drills of lower classes. Field officers and captains are appointed from this class. These officers are paid. The positions in every case are obtained by competition. It is to be understood that cadets obtaining these positions will be reported to the Adjutant-General of the army as distinguished cadets.
3 laboratory hours, credit, 1.
Captain Fleet.

80. **III.** Drill. — Seniors. As stated under Course 78.
3 laboratory hours, credit, 1.
Captain Fleet.

Physical Education and Hygiene.

Associate Professor Hicks, Mr. Gore, Mr. Fitzmaurice.

Physical Education.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in military science. All classified undergraduate students are given a physical examination upon entering.]

Required Courses.

1. **I.** Hygiene. — Freshmen. Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation.
1 class hour. Credit, 1.
Professor Hicks.

5. **II.** Elementary Gymnastics. — Freshmen. Exercises, games and athletics.
3 laboratory hours, credit, 1.
Mr. Gore and Mr. Fitzmaurice.

26. **II.** Graded Gymnastics. — Sophomores. Exercises, games and athletics.
3 laboratory hours, credit, 1.
Mr. Gore and Mr. Fitzmaurice.

51. **II.** Gymnastics. — Juniors. Drills, games and athletics.
3 laboratory hours, credit, 1.
Mr. Gore and Mr. Fitzmaurice.

Elective Course.

77. **III.** Training Course. — Seniors. History of physical education; supervision of indoor and outdoor athletic contests and games; athletic administration.
1 class hour. Credit, 1.
Professor Hicks.

The Graduate School.

The Graduate School.

Kenyon L. Butterfield, A.M., LL.D., President of the College.

Charles H. Fernald, Ph.D., Honorary Director of the Graduate School.

Charles E. Marshall, Ph.D., Director of the Graduate School and Professor of Microbiology.

Graduate Staff, 1916-17.

Professor Anderson, Professor Cance, Professor Chamberlain, Associate Professor Chenoweth, Professor Crampton, Professor Fernald, Professor Foord, Professor Graham, Professor Hart, Dr. Itano, Assistant Professor Jones, Professor Lindsey, Professor McNutt, Associate Professor Nehrling, Professor Osmun, Professor Peters, Professor Sears, Dr. Shaw, Associate Professor van Suchtelen, Professor Waugh, Director Marshall, President Butterfield; Mr. Watts, Secretary.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years; the degrees of master of agriculture and doctor of agriculture are now granted to meet strictly professional needs. The number of requests for each of these courses is apparently increasing. In recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station specialists in farm management, dairying, live-stock husbandry, poultry science, agronomy, landscape gardening, pomology, vegetable gardening and floriculture; for positions as bacteriologists, botanists, chemists, entomologists; and for numerous other positions requiring a great amount of scientific knowledge, training and experience.

Organization.

The school is based upon the department as the unit, and the apprenticeship system as the most effective means of instruction. This gives to the student individuality in treatment and an intimacy with actual conditions of work and operations. Besides, each student is assigned to an advisory committee, composed of the instructor in charge of his major subject as chairman, and instructors in charge of his minor subjects as members, which directs his graduate studies. The chairmen of all these committees together constitute the graduate staff, which controls the policy of the graduate school.

Admission.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the instructor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership in the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Nature, Methods and Requirements of Graduate Work.

Graduate work differs from undergraduate work in its purposes and methods. The primary aims of the instructor are emphasized in an attempt to have the student adjust himself and place himself in his environment; develop the rule of self-direction and self-instruction; acquire the power of accurate reasoning; gain proficiency and skill in his selected field of study or practice; and obtain an appreciative and discriminative insight into experimentation and original research. Methods are not devised, therefore, for attractiveness, entertainment and superficial reviews, but for the creation of initiative and profound thought, thorough acquaintance with detail, independent advance and industrious habits. Careful reading, lectures, conferences, surveys, laboratory exercises and field work are some of the agencies utilized.

All members of the graduate school are required to attend the course of lectures designed to supplement the technical work of all graduate studies. These lectures will be given once each week, and the students will be held responsible for the work.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as a major and the other as a minor. These subjects may not be selected in the same department. An original thesis is considered a part of the major subject.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major and the others as minors. No two of these subjects may be taken in the same department. An original thesis shall be considered a part of the major subject.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary properly to equip the individual professionally.

Candidates for the degree of doctor of agriculture are required to select a major and such other subjects as will develop the major in its greatest intensity and comprehensiveness. Successful experience is also requisite, together

with a thesis which represents a masterly survey or intimate study through accurate application of some phase of the major subject.

Candidates for membership in the graduate school who do not desire to work for a degree may, with the approval of the director of the school, take more than one subject in the same department, or pursue work in several departments, if their preparation will permit. A statement of the subjects chosen must in each case be submitted to the director of the graduate school for approval by the student's advisory committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised and credit granted as are essential to the highest standards of efficiency.

Theses.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject; must show that its writer possesses the ability to carry on original study; and must be an actual contribution to knowledge.

The thesis in its final form, must be submitted to the director by May 15 of the year in which the student is to present himself for the advanced degree, and before he may take the required oral examination. Three complete copies are required. One of the said copies is to be retained as an official copy by the said director, one is to be deposited in the college library, and the third is to be retained by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis.

Final Examinations.

For the degree of master of science or master of agriculture, final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degrees of doctor of philosophy or doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

Degrees conferred.

The degrees of master of science and master of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half [1] to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours [1] each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary. The thesis may be waived for the degree of master of agriculture.

[1] All time statements refer to minimum time.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the instructors in charge.

5. The payment of all fees and college expenses required.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours[1] each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the instructors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science or master of agriculture is $10, and for the degree of doctor of philosophy or doctor of agriculture, $25.

Courses offered.

Courses available as major subjects for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.
Microbiology.

Courses available as major subjects for the degree of master of science: —

Agriculture.
Agricultural economics.
Agricultural education.
Agronomy.
Animal husbandry.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.

Courses available as major subjects for the degree of master of agriculture: —

Agronomy. Animal husbandry. Poultry science.

Courses available as minor subjects for the degree of doctor of philosophy: —

Agriculture.
Agricultural economics.
Agricultural education.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Microbiology.
Poultry science.
Rural sociology.
Zoölogy.

[1] All time statements refer to minimum time.

Courses available as minor subjects for the degree of master of science: —

Agriculture.
Agricultural economics.
Agricultural education.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Microbiology.
Mathematics and physics.
Poultry science.
Rural sociology.
Veterinary science.
Zoölogy.

General Outline of Courses for Advanced Degrees.

Agricultural Economics (Major Course). — 1. Graduate research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances the method includes facility in investigation, tabulation and interpretation of results.

2. Candidates for the master's degree, or candidates offering a minor in agricultural economics, will be required to pass an examination covering the undergraduate work now offered in agricultural economics, including Course 50, the elements of economics, Course 75, the agricultural market and Course 52, co-operation in agriculture; and in addition such definite research work as may be outlined by the department, to consist of original investigations in some particular divisions of the subject of agricultural economics. Courses 52, 75, 76 and 77 are for graduates and undergraduates. Special investigations may be made by electing seminars in agricultural economics.

3. Candidates for the master's degree will be required to write a thesis or a report covering results of a specific line of personal investigation in one or more fields of the subject. Each candidate will also be required to have a working knowledge of the general field of economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, statistics of agriculture and prices, and markets and marketing.

Agricultural Education (Major Course). — Courses are available in agricultural education as major or minor subjects for the degree of master of science, or, as a minor subject, for the degree of doctor of philosophy. Study will be pursued along one or several of the following lines: —

1. Massachusetts school legislation.
2. Origin and growth of primary, secondary and higher education in Massachusetts.
3. The origin and growth of normal schools, industrial schools and agricultural schools.
4. Educational literature, fiction, periodicals and reports.
5. The physical and mental development of the individual.
6. School administration.

Agronomy (Master of Science). — This course is developed in two directions, depending on whether the candidate is preparing for investigational work or for teaching. In the former case more attention is paid to methods of investigation; in the latter, to interpretation of results. The student may specialize in either Part I. or Part II. of the following: —

I. *Soil Fertility.* — (*a*) The humus problem: Effect of different cropping systems on the humus content of the soil; cultivation, drainage and liming in their effect on soil humus; increase by green manure crops; use of animal manures as sources of humus; conservation of organic matter.

(*b*) The nitrogen question: Losses of nitrogen as occasioned by cropping systems, tillage methods and soil treatment; gain of nitrogen through legumes and other agencies; commercial nitrogen, physiological effect upon the plant, comparison of different forms both in regard to their ultimate as well as immediate effect, amount of application from the business standpoint.

(*c*) Mineral elements of plant food: As above for nitrogen.

(*d*) Lime: Causes of "soil acidity;" comparison of forms of lime; ultimate effect of lime on soil fertility; cost *versus* returns from use of lime.

(*e*) Crop adaptability.

II. *Field Crops.* — (*a*) Distribution, as governed by soil fertility; climatic influences; economic conditions.

(*b*) Kinds and varieties.

(*c*) Cultural methods.

(*d*) Breeding: A knowledge of the principles of breeding is presupposed. With this as a basis, a study of methods, practices and results, as applied to a given crop, must be made.

III. *Thesis.* — The thesis may be taken either in soil fertility or in crop production. In either case a problem for original investigation must be formulated by the candidate, the line of attack developed, the work carried through and results presented in acceptable form.

Literature. — It is required that the candidate familiarize himself with the available literature of the various topics studied.

Animal Husbandry (Master of Science). — *Course A. Animal Breeding.* — 1. Reading: Thorough survey of the scientific works dealing with plant and animal breeding and improvement.

2. Project: Each student must outline and pursue some Mendelian problem.

3. Thesis: This is to be a complete treatise of the problem which the student undertakes; it should be a valuable contribution to the present knowledge of the question of animal breeding

Course B. Animal Nutrition. — This course is in outline similar to A. It is designed to cover the field of nutrition, feeding and management of live stock.

Seminar: Regular periods will be devoted to a discussion of the projects undertaken, together with criticisms of the available material on the question pursued.

Object. — To give the student a comprehensive knowledge of feeding, breeding and management of live stock. This may be divided into a major and a minor, in order to give the student the opportunity of devoting a proportionate share of his time to the class of live stock in which he is particularly interested.

Reading. — The student is to make a very complete survey of experimental and periodical literature dealing with the various phases of the subject.

Practice. — Before the completion of the work for the degree, the student must have the equivalent of at least one year's continuous work on an approved live-stock farm.

Seminar. — Regular periods to discuss progress of the work.

Animal Pathology (Minor Course only). — 1. Reviews in anatomy.

2. Reviews in organography and histology.

3. Special lectures and readings in general and special pathology.
4. Laboratory studies in general and special pathology.
5. Pathological technique.
6. Conferences.

Botany (Major Courses). — The equivalent of certain undergraduate courses, determined in the case of each student by the department, is prerequisite. Candidates for the degree of master of science are required to pass a final examination in writing. A final examination in writing before the department and an oral examination before the graduate staff must be passed by candidates for the degree of doctor of philosophy. Candidates for the latter degree are required to attend all graduate lectures given by the department. Candidates for the degree of master of science will take those lectures given during their period of study in the department. All lecture courses will be given in rotation, except courses (*a*) and (*b*), which will come every year. There will be three lectures a week throughout the fall, winter and spring terms. These lecture courses, outlined below, are designed to cover a period of three years.

(*a*) *Plant Physiology.* — The lectures will consider, under the nutrition of the plant: its chemical structure, absorption of various nutrient substances and their changes in the plant, assimilation and dissimilation of carbon and nitrogen by autotrophic and heterotrophic plants; under changes in the form of plants: growth and form under constant external factors, the influence of variable external and inner factors on growth, form and development; and under plant movements: the various tropisms, nutations, etc. Supplemental demonstrations, laboratory work and readings in the standard texts and journals. One lecture a week for 36 weeks.

(*b*) *Plant Pathology.* — A general consideration of the history, nature and causes of plant disease; parasitism, predisposition, immunity, degeneration, natural and artificial infection, dissemination, epidemics, biologic strains, monstrosities and malformations, proliferation, prevention and control, economics of plant diseases. One lecture a week for 36 weeks.

(*c*) *Normal and Pathogenic Metabolism.* — The lectures in this subject embrace, in more or less detail, comparative consideration of the metabolism of the host in health and disease; the metabolism of the parasite under varying conditions; enzyme activities in host and parasite; methods of preparation and determination of enzyme activities; chemical and physical changes induced in plant tissue by parasites; immunity, etc. Current investigations and new phases of the subjects under discussion will also receive attention as they appear. One hour a week for 24 weeks.

(*d*) *Plant Evolution.* — Consideration of plant life in its inception; differentiation; origin and evolution of sexual and asexual reproduction; variation; heredity and adaptation; phylogenetic relationships. One lecture a week for 24 weeks.

(*e*) *Biologic Relations.* — Consideration of certain phases of the morphological and physiological adaptations of plants with regard to insect visit; the rôle of thorns, hairs, tendrils, glands, etc. Various experiments will be made to test out experimentally some of the existing theories concerning biologic adaptations. One lecture a week for 12 weeks.

(*f*) *The Ecology of Plants.* — This course deals with the water, light and temperature relations of plants, and the various adaptations in response to these factors; the various types of plant formation; the migration of plants;

the competition of plants; invasion and successions of plants under varied conditions; and the various types of alternations and zonations. One lecture a week for 12 weeks.

(*g*) *Physiological Plant Pathology.* — This course considers those plant diseases not due to bacterial or fungous parasites, but resulting from unfavorable physical or chemical conditions of the soil; from harmful atmospheric influences, such as too dry air, too much moisture, hail, wind, lightning, frost; from injurious gases and liquids; from lack of or too much light; from wounds. A knowledge of the normal physiology of the plant is required. Demonstrations and laboratory work will be given, together with assigned readings. One lecture a week for 12 weeks.

(*h*) *History of Botany.* — A historical survey of the science; history of certain culture plants, such as wheat, corn, coffee, potato, rice, and their influence on civilization. One lecture a week for 18 weeks.

Seminar: A weekly seminar for members of the department staff, graduate students and major senior students is held, at which important current botanical papers are discussed. Attendance and participation are required.

Collateral Reading: Extensive reading of botanical literature in English, German and French, designed to give the student a broad knowledge of the science, is required of all major students. Final examinations are based in part upon this reading course.

Thesis: Each major student is required to select a problem in plant pathology or physiology (in other branches at the discretion of the department) for original investigation, and the thesis must embody a distinct contribution to knowledge. An effort will be made to assign problems having some bearing on scientific and economic agriculture.

Professor Osmun, Dr. Chapman, Associate Professor Anderson, Assistant Professor Clark.

Minor Course. — For a minor a student may take such of the work offered by the department as seems best suited to his major course. In most cases no problem will be assigned.

Chemistry. — I. Major courses for the degree of master of science. Students will be required to take Courses 101, 108 to 114. In addition to this the requirements in the various thesis subjects are: —

Organic and Bio-Chemistry. — Courses 115 and either 105, 106 or 107, and 6 hours for one term selected from Courses 103 (*b*) and (*f*), and 104.

Analytical and Industrial Agricultural Chemistry. — Courses 116, 103 (6 hours), and 6 hours for one term selected from Courses 102, 104 to 107.

Physical Chemistry. — Courses 104, 117, and 6 hours for one term selected from Courses 102, 103, 105 to 107.

Agricultural Chemistry. — Courses 103 (6 hours), 118, and 6 hours for one term selected from Courses 102, 104 to 107.

The candidate must pass a final written and oral examination before the Department of Chemistry upon undergraduate Courses 1 to 80, inclusive, and upon all graduate work taken in chemistry by him.

II. Major course for the degree of doctor of philosophy. Students will be required to take Courses 101 to 114, and one course selected from 115 to 118. In addition, the student may be required to spend at least two terms or one semester at some other recognized institution pursuing graduate work in chemistry. The candidate must pass a final written examination before the

Department of Chemistry, and an oral examination before the graduate staff, upon the whole field of chemistry, and must be especially well prepared in the lines of work covered by his research.

III. Minor course for the degrees of master of science and doctor of philosophy. Students will be required to take work totaling 54 to 78 hours. This may be selected from any of the undergraduate Courses 27 and 51 to 80, or any of the graduate courses for which the student is prepared. In addition, the candidate must pass a final written and oral examination before the Department of Chemistry upon the courses taken and upon undergraduate Courses 27 and 51 to 80.

The following is a list of the courses: —

101. *Inorganic Preparations.* — Laboratory. The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Ten to fifteen of the preparations given in Biltz's "Laboratory Methods of Inorganic Preparations" will be made by each student. Any term, 6 hours. Professor Anderson.

102. *Advanced Inorganic Preparations.* — Laboratory. Continuation of Course 101. Any term, 6 hours. Professor Anderson.

103. *Advanced Analytical Chemistry.* — Laboratory. This course may be taken in part as follows: (*a*) electrolytic analysis, 6 hours; (*b*) ultimate analysis, 6 hours; (*c*) special analytical work to meet the needs of the individual student, 6 hours. In addition, parts of undergraduate Courses 61, 62, 76 and 77 may be taken, as follows: (*d*) fertilizers, 6 hours; (*e*) insecticides, 6 hours; (*f*) milk and butter, 6 hours. (*a*), (*b*), (*c*) may be taken any time; (*d*), (*e*), (*f*) must be taken at the time the undergraduate course is given.
Professor Wellington and Professor Peters.

104. *Advanced Physical Chemistry.* — Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; per cent. hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; critical temperature of carbon dioxide or sulphur dioxide; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; adsorption of iodine by charcoal; splitting of racemic glycerinic or racemic tartaric acids into their optical components. To each student separate work will be assigned. Any term, 6 hours. Professor Anderson.

105. *Advanced Organic Preparations.* — Laboratory. The preparation of compounds not included in Courses 51 and 52, such as the Kolbe synthesis of salicylic acid; benzophenone and Beckmann's rearrangement; rosaniline, malachite green, congo red, indigo and other dyes; synthesis of fructose; Grignard reaction. Barnett, Cain and Thorpe, Gatterman, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Any term, 6 hours. Professor Chamberlain.

106. *Advanced Bio-Chemistry.* — Laboratory. The hydrolysis of proteins and isolation of the amino acids; the study of milk, blood and urine; dietary and digestion studies. References: Abderhalden, Plimmer, Salkowski, Hawk, etc. To each student separate work will be assigned. Any term, 6 hours.
Professor CHAMBERLAIN.

107. *Industrial Organic Chemistry.* — Laboratory. The preparation, on a large scale, of wood alcohol, acetic acid, ethyl alcohol, benzene and cellulose products, such as mercerized cotton and artificial silk. References: Molinari, Rodgers and Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Any term, 6 hours.
Professor CHAMBERLAIN.

108. *Theoretical Chemistry.* — Lectures. The following topics are considered: the compressibility of the atoms; the structure of atoms; the electron conception of valence. First term, 1 hour. Given in 1917–18. Alternates with Course 109. Professor PETERS.

109. *Analytical Chemistry.* — A general survey of methods and technique covering processes commonly carried out in the laboratory. Gooch's Quantitative Analysis is used as a text. First term, 1 hour. Given in 1916–17. Alternates with Course 108. Professor PETERS.

110. *Organic Chemistry.* — Lectures. Some of the following topics will be considered both theoretically and industrially: alkaloids, synthetic dyes, essential oils, terpenes, rubber, etc.; the study of methods for carrying out general reactions; isomerism, tautomerism, condensation, etc. References, Cain & Thorpe, Cohen, chemical monographs, Lassar-Cohn, Heinrichs, Molinari. Second term, 1 hour. Given in 1916–17. Alternates with Course 111. Professor CHAMBERLAIN.

111. *Bio-Chemistry.* — Lectures. Some of the following topics will be considered both chemically and physiologically: fats, cholesterol, lecithin, carbohydrates, amino acids, proteins, urea, uric acid, purine bases, enzymes, fermentation, animal food and nutrition, photosynthesis. References, Monographs on Bio-Chemistry, Abderhalden, Plimmer, Haas & Hill, Lewkowitsch, Fischer, Euler, Mathews, Czapek. Second term, 1 hour. Given in 1917–18. Alternates with Course 110. Professor CHAMBERLAIN.

112. *Theoretical and Physical Chemistry.* — Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hindrances; stereoisomerism of other elements than carbon; molecular association; similarity between the compounds of silicon and carbon. Third term, 1 hour. Given in 1917–18. Alternates with Course 113.
Professor ANDERSON.

113. *Theoretical and Physical Chemistry.* — Lectures. Radioactivity; the application of physical chemistry to industrial chemistry. Third term, 1 hour. Given in 1916–17. Alternates with 112. Professor ANDERSON.

114. *Seminar.* — Conferences, reports or lectures. Three terms, twice a month, 1½ hours. Professor LINDSEY.

115. *Research in Organic and Bio-Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor CHAMBERLAIN.

116. *Research in Analytical or Agricultural Industrial Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by the amount of work done.
Professor WELLINGTON and Professor PETERS.

117. *Research in Physical Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.
Professor ANDERSON.

118. *Research in Agricultural Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor LINDSEY and EXPERIMENT STATION ASSOCIATES.

ENTOMOLOGY (Major Courses, Ph.D. degree). — 1. *Morphology.* — Lectures on all, and laboratory work on a portion of the following subjects: embryology and polyembryology; transformations; histology; phylogeny; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogamy; chemistry of colors; coloration; luminosity; deformities; variation.

2. *Ecology.* — Lectures and laboratory work as above on the following subjects: dimorphism; polymorphism; protective devices; mimicry; psychoses; insect architecture; plant fertilization; insect products; geographical distribution; methods of distribution; migration; geological history; insects and disease; enemies of insects, vegetable and animal; duration of life; experimental entomology.

3. *Economic.* — Lectures and laboratory work as above on the following subjects: special methods of control; insecticides; special research; insect photography; methods of preparing illustrations; field work and life-history investigations; insect legislation; methods of record keeping.

4. *Systematic.* — Lectures and laboratory work as above on the following subjects: history of entomology; classifications and principles of classification; nomenclature and its rules; how to find and use literature; preparing indices; number of insects known and in existence; lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections; location of types.

5. Seminar; required readings; thesis.
Professor FERNALD, Professor CRAMPTON, Dr. REGAN.

All of these five courses are required of students taking a Ph.D. in entomology.

Minor Courses. — Such portions of the major courses as are most closely correlated with the other lines of work taken by the student and which can be completed in the time available.

Horticulture. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now constitute the college Division of Horticulture, as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Prof. F. A. Waugh, head of the Division of Horticulture.

Landscape Gardening (Major Course). — Every student before receiving his master's degree in landscape gardening must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. *Theory.* — The principles of esthetics as applied to landscape gardening.

2. *Design.* — The principles of pure design and their application in landscape and garden planning.

3. *Construction.* — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.

4. *Maintenance.* — Methods, organization, cost.

5. *Practice.* — Office work, drafting, estimating, reporting, charges, accounting.

Qualifications. — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

The minimum period of graduate study will be one and one-half years. At least one year of this time must be spent in residence at the college, and also one year must be spent in practice outside the college. The work done outside the college may be prescribed by the department, and must be fully reported to the department in writing. It is essential, further, that the candidate secure the written approval of his employers outside the college. The department may, at its discretion, require a longer period of study at the college or a longer apprenticeship outside the college.

Thesis or Project. — Each student before receiving the master's degree with a major in landscape gardening must present a satisfactory thesis or complete project. A thesis will consist of a careful original study of some problem in landscape architecture, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of —

(*a*) Original surveys, including topography.

(*b*) Block plans, showing original design.

(*c*) A rendered plan or plans of the main features.

(*d*) Detailed working drawings.

(*e*) Estimates of cost.

(*f*) Complete report and letter of transmittal.

Minor Course. — Any student electing a minor in landscape gardening will be directed to take such courses from the regular catalogue list as may seem most suitable for him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

Prerequisite Work. — The undergraduate courses in the college known as Landscape Gardening 50, 51, 52 and 53, Drawing 25, 26, 27, Horticulture 27, 50, 51, and Mathematics 26 and 27 will be considered prerequisite to graduate work, and any student not having passed these courses or their equivalent will be required to make up such work without graduate credit. Courses known as Landscape Gardening 75, 76, 77, 78 and 79 are required and may or may not be accepted for graduate credit, at the discretion of the department.

Microbiology (Major Course). — 1. *Reading.* — Readings will be assigned and reports with critical analyses of literature covering the general subject will be required. For this purpose such material will be selected as will be most pertinent to the needs of the student. Lectures will be given from time to time.

2. *Seminar.* — At intervals the immediate laboratory work and studies of the student will be surveyed and the literature bearing thereon will be discussed. The shaping of investigations in accordance with the critical analyses of the specific literature of the problem involved will be the important rôle of the seminar.

3. *Morphological and Cultural Studies.* — Special advanced studies in the cytology, morphology and cultural characters of micro-organisms will be the general theme of this course. The important factors in classifying and grouping organisms call for an intimate knowledge of this particular phase of microbiology. Laboratory technic will receive emphasis.

4. *Physiological Studies.* — The changes produced by micro-organisms and their functionings in general open a very broad field for investigation and systematic study. It is advised that every graduate student in microbiology give much attention to this branch, gaining thereby the greatest comprehensive knowledge of physiological processes, as well as the methods employed in their determinations.

5. Special advanced courses will be offered in those phases of microbiology indicated by the undergraduate courses: —

1. Fermentation microbiology.
2. Soil microbiology.
3. Dairy microbiology.
4. Food microbiology.
5. Hygienic and sanitary microbiology.

It will be assumed that all graduate students of microbiology must be acquainted with the details of all important phases of agricultural microbiology.

Minor Course. — 1. Courses constituting undergraduate major in microbiology, or their equivalent, will be required.

Note. — If the student is familiar with the work of these courses, advanced work will be given in accordance with the graduate major outline.

2. Emphasis will be placed upon that particular phase of microbiology which will be particularly pertinent to the student's major course.

3. Readings will be assigned, and will be reviewed in conferences.

4. Special lectures on selected subjects in microbiology will be given from time to time.

Poultry Science (Major Course for the Degrees of M.S. and M.Agr.). — 1. *Reading.* — A review of the entire field of poultry literature, covering books, bulletins and special articles, is made, and a written report on one or more subjects required.

2. *Seminar.* — A critical review and a criticism of the more important experiments carried on at the various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc., besides a detailed study of some of the largest poultry projects in this country.

3. *Anatomy (Gross and Histological), Physiology and Surgery.* — This course requires a careful study of the anatomy and physiology of the fowl. Special attention is given to a study of those structures concerned with practical poultry problems. Instruction in surgical technique, adapted to fowls, may also be given.

4. *Breeding.* — The student will carry on such breeding experiments as time and facilities permit. He may also do work in connection with our regular experimental projects. A detailed study of the pertinent literature will be required. Animal Husbandry 5, or its equivalent, is a prerequisite.

5. *Feeding.* — A study of the relation of various foods and other substances to the morphology and physiology of the bird, with special reference to such subjects as egg production, feather form and structure, condition of flesh, bone, etc.

6. *Brooding.* — Studies will be made upon the relation between viability and rate of growth and the following topics: type of brooder, number of chicks in brood, ventilation, humidity, sanitation, exercise and weather conditions; also a comparison of natural methods with artificial methods of rearing chicks.

7. *Incubation and Embryology.* — A number of problems of a practical, scientific and mechanical nature relating to incubation are considered. The work in embryology is of an advanced nature dealing with its relation to morphogenesis and heredity, and presupposes an elementary knowledge of the embryology of the chick.

8. *Poultry Diseases and Sanitation.* — In this course a study is made of various problems in poultry sanitation, with particular reference to methods relating to the control and eradication of disease.

9. *Thesis.* — A thesis based on first-hand work on some problem in poultry biology or husbandry is required of all students working for the M.S. degree, and may be required of those working for the M.Agr. degree.

Note 1. The postgraduate course presupposes all undergraduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 5, 6 and 7. At the discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

Note 2. Practical poultry work may be required, but no credit will be given for such work.

Note 3. Courses 1 and 2 are designed particularly for minors.

Rural Sociology. — Courses are offered in Rural Sociology as major or minor subjects for the degree of doctor of philosophy.

Candidates for the master's degree will be required to pass an examination in all courses offered by this department primarily for undergraduates, as shown in the departmental classification. In addition they will be required to select one or more of the divisions of the subject for intensive study and research, as indicated below.

A thesis showing the results of personal investigation on some particular topic or topics must be presented. The thesis must show familiarity with the material bearing on the subject, ability in discovering and utilizing original sources, judgment in evaluating facts, evidences and authorities, originality and independence of thought. It must be a contribution in a very definite way to rural sociological thought.

Topics for Study and Research.

1. The rural community: —
 (*a*) Historical development.
 (*b*) Influence of modern conditions on family and community life.
 (*c*) Problems and methods in community organization.
 (*d*) Community planning in Massachusetts.
2. Origin and development of rural institutions: —
 (*a*) Scope, function and influence of educational institutions on rural social progress. Plans for betterment.
 (*b*) History of the development of the rural church, its problems and program for improvement.
 (*c*) The farm family, in its relation to religious, cultural, educational and social agencies. The relation of the standard of living to rural social progress.
3. Rural organization: —
 (*a*) The scope and function of rural organization in development of rural life.
 (*b*) Work of the national government in rural organization.
 (*c*) County and institutional work in rural organization.
 (*d*) Leadership in its relation to organization.
4. Rural government and rural law: —
 (*a*) Development of rural local government in New England and the west. Progress in efficient local self-government.
 (*b*) Relation of the State to the farmer, influence of the farmer in legislation, the organized ways and means by which the State aids the farmer directly.
 (*c*) Work of the national government in its relation to the social welfare of the farming people.
 (*d*) Agrarian legislation in the United States and Europe affecting rural social welfare.
5. Farmers' organizations: —
 (*a*) Social problems underlying farmers' organizations in reference to service and permanency.
 (*b*) Principles of organization.
 (*c*) History of farmers' organizations in the United States.
6. Rural social and sociological surveys: —
 (*a*) An intensive study of the place and function of statistical data in the sociological field, its evaluation and interpretation.
 (*b*) A critical study of social surveys of rural life and methods of survey, with a view to discovering the strength and weakness of each.
7. Social condition of the rural people: —
 (*a*) Origin and development of rural ideals.
 (*b*) The status of the rural people in relation to health, morality, crime, etc.
 (*c*) Problems of social psychology arising in rural life.

The course required for candidates offering a minor will be arranged after a conference with the director of the department, and will take into consideration the needs of the student in view of his previous preparation. The

amount of time required of the student for his minor work will correspond with the requirements of the graduate school.

Veterinary Science. — Work is available in anatomy, hygiene, veterinary pathology, medicine, surgery, parasitology and other special lines or divisions of the subject.

Zoölogy. — Courses in zoölogy may be available as a minor for the degree of master of science and as a minor for the degree of doctor of philosophy. The nature of the work will necessarily vary according to circumstances, and may be intensive in a special field, like that of embryology or economic ornithology, and be correlated closely with the major work of the student, or it may be of a more general character, depending on the student's needs or previous acquaintance with general zoölogical science. The time devoted to zoölogy as a minor for either of the above-named degrees may vary from 12 to 16 hours per week, pursued for a year and a half.

List of Students.

A list of the degrees conferred in the Graduate School, and of the students enrolled, is given in the general lists at the end of the volume.

THE SHORT COURSES

AND

THE EXTENSION SERVICE.

The Short Courses.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those who cannot come to the college for the regular academic courses. They furnish the student with instruction in modern accepted methods, and are made as concentrated and as practical as possible. In the main, the instruction is given by the regular teaching force of the college, the same laboratories and equipment being used as in the regular college work.

The short courses may be grouped as follows: —

A. Winter Schools.
 1. Ten Weeks' Course.
 2. Spring Beekeeping School.
 3. Apple Packing School.

B. Summer Schools.
 1. Summer School of Agriculture and Country Life.
 2. School for Rural Social Service.
 3. School for Library Workers.

Expenses of the Short Courses. — The expense of attending any of the short courses is approximately as follows: —

Registration fee (Ten Weeks' Course, Apple Packing School, Summer School),	$5
Furnished rooms in private houses (per week),	$1.50–$3
Board at college dining hall (per week),	$4.50–$5
Board with private families (per week),	$6–$7

A lunch counter is operated in connection with the college dining hall. Meals may be obtained there *à la carte* at very reasonable rates.

Students in each of the dairy courses must provide themselves with two white wash suits and caps for use in the practical dairy work. The cost in Amherst is about $1.25 for suit and cap.

Requirements for Admission to Short Courses. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic. Practical experience in farm, garden, orchard or greenhouse work is an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character. References are required, and these are investigated before applicants are accepted.

A. Winter Schools, 1917.

1. Outline of the Ten Weeks' Courses (January 1 to March 9, inclusive). — The following courses are offered: —

1. Soil Fertility. Assistant Professor Jones. Three lectures a week.
2. Field Crops. Assistant Professor Jones. Two lectures and one two-hour laboratory period a week.

3. Types and Breeds of Live Stock. Professor McNutt. Three lectures and two two-hour judging periods a week.
4. Live Stock Feeding. Assistant Professor Quaife. Three lectures a week.
5. Animal Breeding. Professor McNutt. One lecture and one two-hour laboratory period a week.
6. Dairying. Professors Lockwood and Jamison, Mr. Coons. Five lectures and one one-hour, two two-hour and two three-hour laboratory periods a week.
7. Dairy Bacteriology. Professor Marshall. Two lectures a week.
8. Animal Diseases and Stable Sanitation. Professor Paige. Two lectures a week.
9. Poultry Husbandry. Professor Graham and Mr. Payne. Five lectures and one two-hour laboratory period a week.
10. Farm Management and Farm Accounts. Professor Foord. One lecture and one two-hour laboratory period a week.
11. Fruit Growing. Professor Sears. Three lectures and one two-hour laboratory period a week.
12. Market Gardening. Assistant Professor A. S. Thomson. Three lectures and two two-hour laboratory periods a week.
13. Landscape Gardening. Assistant Professor Harrison. Two two-hour periods a week.
14. Floriculture. Associate Professor Nehrling. Three lectures a week; field trips on Saturday.
15. Forestry. Professor Clark. One lecture a week.
16. Botany. Assistant Professor Anderson. Two lectures a week.
17. Entomology. Dr. W. S. Regan. Three lectures a week.
18. Beekeeping. Associate Professor Gates and Mr. Byard. Two lectures and one two-hour laboratory period a week.
19. Farm Mechanics. Professor Gunness. One lecture and one two-hour laboratory period a week.
20. Rural Sanitary Science. Professor Marshall. Two lectures a week.
21. Rural Improvement. Professor Waugh. Two lectures a week.
22. Problems of Marketing and Distribution. Professor Cance. Two lectures a week.

1. Spring Beekeeping School. — This school is held in Amherst once in three years, being conducted in other sections of the State in intervening years. It is an intensive course for a limited number of beekeepers. It occupies seven hours daily for a period of two weeks. Courses are given in practical beekeeping; life of the honeybee; special problems of the beekeeper; crops foraged by bees; relation of bees to pollination of plants; bees in horticultural practice. The instructors are Professors Gates, Fernald, Paige, Brooks, Osmun and Chenoweth and Mr. Byard. Dates to be announced.

2. Apple Packing School. — The work of this school, which is conducted by the Department of Pomology, is of a practical nature, and includes both box and barrel packing. Persons taking the course will become familiar with the various types of packs, and will receive sufficient practice to enable them to do good commercial packing. The 1917 school will probably be held in November, on dates to be announced.

B. Summer Schools.

1. The Summer School of Agriculture and Country Life. — The Summer School of the Massachusetts Agricultural College will open July 2, 1917, for a term of four weeks. The work of the summer school was designed originally for teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Practical courses are offered for the benefit of such persons.

The formal instruction in the summer school is given in definite courses. Each student may elect not less than 10 nor more than 15 exercises a week, unless a larger or smaller amount of work is allowed by the supervisor. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

General field exercises are arranged for one afternoon of each week. These are on topics of interest to all. Excursions are arranged for every Wednesday afternoon, and more extended excursions for the whole school are planned for every Saturday. These excursions are in charge of an instructor. In the past they have proved a very enjoyable feature of the work. Round-table and special discussions are arranged by the various instructors as their courses require.

A course of evening lectures on popular topics relating to the work of the school is a feature of the general program. This lecture course is free to all students.

Early registration is desirable. Registration fee for the summer school is $5, payable at the time application is made. No other tuition is charged. This fee should accompany application blank and should be made payable to the Massachusetts Agricultural College.

2. The School for Rural Social Service. — The Massachusetts Agricultural College offers a School for Rural Social Service in connection with the usual Summer School of Agriculture and Country Life. The courses offered give instruction, furnish information and direct the attention of those interested more particularly to the rural field, which has as yet received little systematic study when compared with that which has been given to urban conditions.

The courses offered are intended for clergymen, teachers, librarians, town officers, grange workers and others who devote a considerable portion of their time to problems of community development. Other courses given in the summer school during this period are also open to those who register. There is a registration fee of $1 for those attending this school. The dates are to be announced.

3. School for Library Workers. — During the summer of 1915 a very successful School for Library Workers, of one week's duration, was held at the college. The work was planned especially for those librarians and library assistants in village and rural libraries whose special training and experience had necessarily been limited. This school will again be offered in July, 1917.

The faculty of the 1916 summer schools was as follows: —

Kenyon L. Butterfield, A.M., LL.D., President of the College.
William D. Hurd, M.Agr., Director of the Extension Service and Supervisor of Short Courses.
Charles R. Green, B.Agr., Librarian of the College.
F. Josephine Hall, A.M., Adviser for Women.
John L. Byard, Superintendent of Apiary.
Alexander E. Cance, Professor of Agricultural Economics.
Walter W. Chenoweth, M.Sc., Associate Professor of Pomology.
William D. Clark, A.B., M.F., Professor of Forestry.
Laura Comstock, Extension Professor of Home Economics.
Samuel Coons, Instructor in Dairying.
E. Farnham Damon, B.Sc., Extension Associate Professor of Agricultural Economics.
Henry T. Fernald, Ph.D., Professor of Entomology.
James A. Foord, M.Sc.Agr., Professor of Farm Administration.
Burton N. Gates, Ph.D., Associate Professor of Beekeeping.
Helena T. Goessmann, M.Ph., Instructor in English.

Harold M. Gore, B.Sc., Assistant in Physical Education.
John C. Graham, B.Sc., Professor of Poultry Husbandry.
Edna A. Post, Organized Play.
Ida E. Hall, LL.B., Plays and Pageantry.
Earl Jones, M.Sc., Assistant Professor of Agronomy.
William P. B. Lockwood, M.Sc., Professor of Dairying.
Frederick A. McLaughlin, B.Sc., Instructor in Botany.
John C. McNutt, B.Sc.Agr., Professor of Animal Husbandry.
Charles J. Maynard, Naturalist and Lecturer, West Newton, Mass.
Orion A. Morton, Extension Professor of Agricultural Education.
Ezra L. Morgan, A.M., Extension Professor of Community Planning.
Ethel H. Nash, Extension Instructor in Agricultural Education.
Arno H. Nehrling, Associate Professor of Floriculture.
A. Vincent Osmun, M.Sc., Associate Professor of Botany.
Samuel R. Parsons, B.Sc., Instructor, Pennsylvania State College.
Charles A. Peters, PhD., Associate Professor of Inorganic and Soil Chemistry.
Frederick W. Ried, Director of Practical Arts, Framingham (Mass.) Normal School.
Marie Sayles, B.S., Extension Instructor in Home Economics.
F. A. Cushing Smith, B.Sc., M.L.A., Extension Instructor in Civic Improvement.
Leone E. Smith, B.Sc., Superintendent, Colchester (Conn.) Boys' Club.
Frank A. Waugh, M.Sc., Professor of Landscape Gardening.
Willard E. Waterbury, Field Secretary, Massachusetts Baptist Missionary Society, Boston.

C. Miscellaneous Short Courses.

1. Short Courses for Special Groups. — Plans are now under way to provide short courses at Amherst, lasting four or five days, for fertilizer agents, feed agents and dealers, milk inspectors, seed dealers, bankers and other groups desiring such instruction. Information concerning these may be obtained by writing the Supervisor of Short Courses.

2. Special Days for Foreigners. — Each year there are provided at the college special days for foreigners. Instruction is given in soil management, co-operation, American citizenship and history. This work for foreigners will be arranged at the college, or in different sections of the State.

3. Meetings of Organizations at the College. — It is customary for the various State organizations of fruit growers, poultrymen, breeders and others to meet for conventions and picnics at the college. Such gatherings are welcomed by the college authorities, and organizations are cordially invited to meet in Amherst. The Extension Service will assist in arranging programs and other forms of instruction and entertainment.

All requests for announcements or further information regarding any of the short courses should be addressed to the Supervisor of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

The Extension Service.

What is known as the Extension Service is an organized effort on the part of the college to carry systematic and dignified instruction to the thousands of people throughout the State who are unable, owing to various reasons, to take advantage of the regular courses offered at the college. It is in reality the "carrying of the college to the people of the State." Every department of the institution, in so far as the regular teaching and research work will permit, contributes what it can to this work. The work may be roughly classified under the following general heads: general administration; correspondence study; itinerant instruction which includes lectures and lecture courses, exhibits, demonstrations and extension schools; extension work through the various departments of the college, in which the extension specialist is responsible to the head of the department for the technique of the work and to the director of the extension service for the accomplishment of the work; co-operative work of various kinds with the United States Department of Agriculture; and extension work through county, district and local agents. Some of the ways in which this is being done are described briefly below.

Courses given at the College.

1. Farmers' Week. — In order to reach those who cannot come to the college for a longer time this very practical course, five days in length, is given each year. The regular college equipment is used, and work of the regular faculty is supplemented by lectures and demonstrations by eminent men and women.

The 1917 program will probably be divided into seven sections, as follows: —

1. Field Crops and Farm Management.
2. Animal Husbandry and Dairying.
3. Poultry Husbandry.
4. Fruit Growing, Market Gardening, Floriculture, Forestry.
5. Women's Section, Home Economics.
6. Business Organization and Marketing.
7. Beekeeping.

These sections take up the time from early morning until late afternoon. Prominent men are engaged for the evening lectures. Fruit, corn, live stock, dairy and poultry shows, and other exhibits, are among the leading features. No fee is charged.

2. Annual Beekeepers' Convention. — This convention of beekeepers is held during Farmers' Week. Illustrated lectures, practical demonstrations and commercial displays are features of the convention. Meetings of State and county beekeepers' associations and of apiary inspectors also are scheduled at this time.

3. Polish Farmers' Day. — A special day is each year set aside which is known as "Polish Farmers' Day." Instruction is given relative to the crops and animals in which the Polish people are most interested, soil fertility problems, co-operation, American citizenship, history, etc. Hundreds of Polish farmers reside in the Connecticut valley, and large numbers avail themselves of this opportunity which is peculiarly their own. It will be held on March 22, 1917.

4. Annual Conference of County Agents and Vocational Agricultural Instructors. — In December of each year a one-week conference of county agents and vocational agricultural instructors is held at the college. This is for the purpose of correlating the extension work throughout the State, and to enable the field workers to keep in up-to-the-minute touch with agricultural problems, methods and research as conducted in Massachusetts as well as other States in this particular section of the country. The next annual conference will probably be held during the third full week in December, 1917.

5. Poultry Convention. — In order to give a large number of poultrymen, who cannot come to the college for a long period of time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, and in marketing poultry products, an annual three-day convention is offered. This will be held from July 25 to 27, 1917, inclusive.

6. Agricultural Camps. — During the month of July three camps are arranged in order that boys from rural districts and small towns may receive some instruction in agriculture and clean, wholesome sports, and that they may have impressed upon them their responsibilities as coming members of society. The daily program consists of camp duty, flag raising, agricultural lessons, talks on hygiene and good citizenship, play and recreation, instruction in handicrafts, photography, evening camp fires and lectures by men prominent in boys' work. A small fee is charged to help defray the cost of board and incidental expenses. As a third prize in the State-wide boys' and girls' clubs a week in camp at the college is offered. The third boys' camp is given over to these prize winners, usually 35 to 40 in number. A separate camp, upon a slightly different plan and under different supervision, is held for the girl prize winners of the previous year.

7. Conference on Rural Organization. — This conference is held as a closing feature of the summer school each year. It takes up various problems of New England country life. Numerous State organizations co-operate with the college in providing the programs. Section meetings of various groups are held each forenoon, a general round-table discussion is held each afternoon, and lectures are delivered each evening by persons prominent in social and educational work. Many small group conferences are also arranged. This conference will follow immediately after the summer school.

Correspondence Courses. — The purpose of the correspondence courses is to furnish systematic instruction in those lines which will most benefit the general farmer, the dairyman, the fruit grower, the market gardener, the poultryman, the teacher, the homemaker, and all others who are interested in agricultural and country-life matters. It is the purpose to present up-to-date, accurate and concise information in such a manner and in such language that all who pursue the study may readily understand the work.

Courses offered. — A number of courses are in process of revision and several are being rewritten. During 1917 courses will be available as follows: —

1. Soils and Soil Fertility. Assistant Professor Jones.
2. Manures, Fertilizers and Soil Amendments. Assistant Professor Jones.
3. Field Crops. Assistant Professor Jones.
4. Farm Dairying. Professor Lockwood.
5. Fruit Growing. Professor Sears, Associate Professor Chenoweth.
6. Market Gardening. Assistant Professor A. S. Thomson.
7. Animal Feeding. Mr. Turner.
9. Farm Accounts. Professor Foord.
10. Entomology. Dr. Regan.
12. Beekeeping. Associate Professor Gates.
13. Forestry. Professor Clark.
14. Shade Tree Management. Professor Osmun.
17. Poultry Husbandry. Professor Graham.
18. Home Economics. Extension Professor Comstock.
19. Rural Sociology. Professor Phelan.

Methods of conducting the Work. — The best known methods of conducting correspondence course teaching are employed. Certain courses are based entirely upon text-books, others consist wholly of typewritten lectures, while others combine the two. If books are not required they are usually recommended.

The courses are designed primarily for the individual student. A new phase of the work, however, is the organization of study clubs or classes, meeting together periodically and using the courses as a basis of study. Correspondence in regard to this work is invited.

Enrollment of Correspondence Courses. — Students may enroll in the courses at any time between October 1 and June 1, and one year from the date of registration is allowed for the completion of each course. It has been found advisable to discontinue the courses through the summer months, as farmers and most other students cannot devote the necessary amount of time to the lessons during this season.

Expenses of the Correspondence Courses. — In order that none shall enroll except those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at $1 for each course except where the courses are divided, and it has been found advisable to charge $1 for each of the parts in these instances. The fee is payable strictly in advance, at the time the enrollment card is sent. When text-books are required the student purchases these.

Miscellaneous Short Courses. — For certain such courses, see page 150.

Lectures and Demonstrations. — The members of the faculty of the college are, when other duties will permit, available for lectures and demonstrations before granges, men's clubs, women's clubs, Y. M. C. A.'s, farmers' clubs, boards of trade and other organizations. A list of more than 40 lecturers and 200 subjects on various phases of agriculture, country life, economics, sociology, education, civic betterment and various scientific subjects has been prepared. Full courses of lectures or single lectures may be arranged.

Organizations arranging the lectures are asked to pay the traveling expenses of the lecturer, provided no admission fee is charged. When admission is charged the lecturer is entitled to a fee in addition to traveling expenses.

Extension Schools. — The extension schools are of two distinct types, the first being the Agricultural Extension School, dealing with the production side of farming and with the problems of the farm home; the second is the Extension School in Community Planning, having to do with the organization and selling end of agriculture, and with instruction in the planning and carrying forward of various community activities.

It is also possible to arrange special extension schools along one particular line of work, such as fruit growing, dairying, etc.

Communities desiring an extension school make a written request, agreeing to defray all local expenses, such as the rent, heating and lighting of a suitable hall, and the board of the instructors during the school.

Agricultural Extension Schools. — The college sends a corps of instructors to a town for a five-day school of instruction. At present the following courses are offered: soil fertility, animal husbandry and dairying, fruit growing, poultry husbandry and vegetable gardening for the men, and a homemakers' course for the women. Morning and afternoon sessions only are held.

Community Planning Extension Schools. — These schools are arranged to extend over at least three days. The following courses are offered: education, agricultural organization, community program, civic improvement, farm management, town administration, public health, community recreation and homemaking. Morning, afternoon and evening sessions are held in these schools.

Educational Exhibits at Fairs and Other Shows. — The college co-operates with the managers of fairs, industrial expositions, corn shows, poultry shows, fruit shows and other exhibitions by making educational exhibits.

For outside work a large tent has been provided. In this about thirty cabinets containing educational material are arranged. A corps of lecturers and demonstrators accompany the exhibit and give practical instruction daily.

For inside work a space at least 40 by 60 feet is required for this exhibit. Smaller exhibits along special lines are sent to corn, fruit and poultry shows, milk shows, child welfare exhibits, and so forth.

The managers of fairs and exhibits are required to partially meet the cost of presenting these exhibits.

Extension Work in Special Fields.

Extension Work in Fruit Growing. — This work includes lectures and demonstrations on laying out and planting orchards, pruning, spraying, thinning, grading, packing and marketing fruits. Demonstration orchards, new and renovation plots, are established in different sections of the State, under a co-operative agreement between the college and the owners of land. Extension schools in fruit growing and fruit grading and packing are arranged on request. Visits to farms for advisory work are made, and correspondence on orcharding subjects is invited.

Extension Work in Animal Husbandry. — This work includes lectures, demonstrations and advisory assistance on subjects pertaining to cattle, horses, sheep and swine, as well as instruction in barn planning. Assistance in organizing dairy improvement associations and breeders' associations is given; stock-judging contests for boys are arranged at the leading fairs.

Extension Work in Dairying. — This includes lectures and demonstrations on the handling and care of milk, cream, butter and cheese; Babcock testing, dairy utensils and dairying manufactures. Educational campaigns may be arranged in different communities, seeking to educate producers, dealers and consumers as to the production and distribution of clean, safe milk.

Extension Work in Poultry Husbandry. — In addition to conferences at the college and visits to the plants of poultrymen, advice on general poultry management, diseases, mating, and laying out and planning buildings, this

work includes co-operative work with other State and county agricultural and educational organizations, exhibits of poultry appliances at fairs and shows and other incidental phases.

Extension Work in Farm Management, Field Studies and Demonstrations. — This is carried on co-operatively between the college and the office of farm management of the United States Department of Agriculture at Washington. It consists of a study of farm conditions and farm management problems; instruction in keeping farm accounts and growing field crops; the use of fertilizer and lime; advice as to farm equipment, buildings, and so forth.

Extension Work in Rural Civic Planning. — This is carried on in connection with the Department of Landscape Gardening at the college. Assistance is rendered in various rural and village improvement enterprises, such as the planting and care of shade and street trees, the planning of playgrounds, school grounds, cemeteries, picnic grounds, the beautifying of waterfronts, the rearrangement and development of town commons and reservations of historic interest, and similar activities. Efforts are made to co-operate with local granges, men's and women's clubs, village improvement societies and like organizations.

Junior Extension Work. — This is an organized effort to promote in the public schools of the State the study of agriculture and practical arts relating to country life. This is accomplished by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children, and lectures before granges, farmers' clubs and other interested organizations. The work of the agricultural clubs is under the direction of the superintendent of schools or some one recommended by him. Each town should hold an annual exhibit of products. Exhibits representing rather extensive districts are incorporated with the various agricultural fairs in the State. In this manner elementary instruction in agriculture is promoted by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College, which in turn co-operates with the State Board and the United States Department of Agriculture.

Extension Work in Home Economics. — The Extension Service, through its home economics workers, stands ready to assist in solving problems relative to the household in the same manner as it is endeavoring through other workers to aid in working out problems of the farm. The work, among other things, includes lectures and demonstrations, assistance in forming girls' clubs and home economics clubs for women, and co-operation with existing organizations in the matter of interesting young people in the proper care of the home.

Local Community Organization. — A number of communities in the State have appealed to the college for aid in bringing the various organizations in the community to a higher state of efficiency, in order that they themselves might take definite steps toward community development and advancement. The college is now prepared to make scientific studies of communities which lead up, by means of surveys, to the organization of local committees to study the agricultural, educational, religious, transportation, recreation and civic needs of the communities. Several State organizations and some national organizations are usually brought in to aid in working out the plans presented by these committees. Conferences on community affairs are held upon request. The college acts merely in an advisory capacity, the communities themselves doing the actual organization work.

Library Extension Work. — This consists principally of loaning to public libraries of the State general collections of 10 to 30 books and bulletins on agriculture and related subjects. Special collections of smaller size on specified subjects, such as fruit growing, dairying, poultry, beekeeping, home economics, and so forth, are also sent out. These may be kept from four to eight weeks, according to the demand for them. The only expense to local libraries is transportation charge on the books both ways. The college library also supplies, upon request, information regarding books on agriculture and related subjects.

Agricultural Surveys. — To acquire definite information as to existing conditions in rural communities, to be used as a basis for further extension work, agricultural surveys are made. The different organizations and officials in the community, such as the town officers, superintendent of schools and teachers, clergymen, librarians and others, usually co-operate in making such surveys. The survey covers all phases of community life, including soil survey, farm management practices, and the educational, social, religious and recreational life. The inventory is made upon carefully prepared blanks.

Business Co-operation and Marketing. — This work has for its object the establishment of agriculture on a better business basis. Assistance is given in organization of co-operative buying and selling associations, the securing of rural credit, the adoption of better methods of marketing, the establishment of a better market for agricultural produce, and other lines of agricultural co-operation.

Demonstration Farms and Plots. — Believing that one of the most effective ways of teaching modern farm practice is by the establishment of demonstrations (not experiments) in all sections of the State, thus showing a man on his own land and under his own conditions the result of proper farm practices, the college is placing demonstration plots throughout the State, showing the proper fertilization for grass and other crops, the results of rotations, the proper care of orchards and dairy management. For several years the Faunce Demonstration Farm has been under the advisory direction of the college, as is also the Paige farm at Hardwick. The Faunce farm has proved to the Cape Cod region that small fruit, poultry and vegetables can be successfully grown there. Demonstration farms are usually managed by a committee or board of trustees representing the farm and a committee appointed from the college acting jointly.

County or District Agricultural Agents. — As rapidly as State, government and local funds are available, men trained in agriculture are being assigned to counties and districts of the State to act as agricultural agents. Residents of the county or district may, without cost, call upon the agent for assistance upon any agricultural subject. The work is being partly supported through the co-operation of the United States Department of Agriculture, the college and the community engaging the agent.

Advisory Work with Institutions and Individuals. — Special effort is made to comply with as many of the requests of State institutions and individuals who ask for advice on farm problems as possible. The force of instructors available for this work is at present insufficient to take care of all the demands. Special trips, including visits to a number of the various State institutions, are occasionally made by a group of specialists.

Publications of the Extension Service. — In addition to the regular circulars and bulletins which announce the various short courses and lines of work mentioned, publications giving timely information on agricultural

subjects are issued. Large numbers of helpful circulars and bulletins are annually distributed. A series of bulletins especially for the farm woman is one feature of this work. Reports of the work of the Extension Service, dairy record blanks, farm account blanks, boys' and girls' club circulars, lists of books, and so forth, may be had upon request.

Co-operation with Other Organizations. — The aim of the Extension Service is to co-operate with existing organizations so far as possible. It is, therefore, glad to work with local organizations, and welcomes suggestions from town officers, local granges, farmers' clubs, women's clubs, Y. M. C. A.'s, Y. W. C. A.'s, boards of trade, village improvement societies, teachers, clergymen, librarians and others interested in agriculture and country life, as to needs and methods best adapted to the meeting of these needs.

Information by Correspondence. — Besides the activities mentioned, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry, which always receive the most careful attention from every department of the institution.

Pamphlets and bulletins are sent free to all who apply for them, and any who desire such help as has been mentioned should address the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

General Information.

General Information.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

Tuition.[1] — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $60 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.

All students entering the college for the first time as undergraduates or unclassified students are charged a matriculation fee of $5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

Dormitories and Board. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present the price of board there is about $5 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

Expenses.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts, free; other citizens of the United States, $60 a year; foreigners, $120 a year.

	Low.	High.
Matriculation fee, first year,	$5 00	$5 00
Room in college dormitories or in private houses,	39 00	110 00
Board in college dining hall, $5 a week,	180 00	180 00
Laundry, 50 to 85 cents a week,	18 00	30 00
Military uniform, first year,	17 00	17 00
Laboratory fees,	5 00	20 00
Books, stationery and miscellaneous items,	11 00	28 00
	$275 00	$390 00

[1] This statement applies to those registering as regular or unclassified students.

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $300 and $425 per year.

Initial Charges.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee,	$5 00	-	-
Board (if at college dining hall) four weeks in advance,	20 00	$20 00	$20 00
Assessment for support of Social Union,	1 00	1 00	1 00
Laboratory fees,	5 00	5 00	2 00–10 00
Military uniform,[1]	17 00	-	-
Room rent (if in college dormitory),	-	-	12 00–20 00
Student tax for support of athletics,[2]	8 00	8 00	8 00
Student tax for support of nonathletic activities,[2]	2 50	2 50	2 50

[1] This cost is subject to modification from year to year.

[2] While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

Laboratory Fees.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present, the fees charged are as follows: —

Agronomy: —	Per Semester.
Course 27, 3,	$1 50
Course 50, 1,	2 00
Course 51, 3,	2 00
Course 75, 1,	1 50
Course 76, 3,	1 50

	Per Semester.
Animal husbandry: —	
Course 1, 1 and 2,	$1 00
Course 25, 1,	1 50
Course 26, 2,	1 50
Course 50, 2,	1 50
Course 78, 2,	1 00
Dairying: —	
Course 50, 1,	2 50
Course 51, 3,	2 50
Course 75, 2,	2 00
Course 76, 3,	3 00
Course 77, 1,	2 50
Farm administration: —	
Course 75, 2,	1 50
Course 76, 3,	1 50
Poultry husbandry: —	
Course 51, 1,	2 50
Course 53, 3,	3 00
Course 55, 3,	2 50
Course 76, 1,	2 00
Course 77, 1,	2 00
Rural engineering: —	
Course 25, 1,	1 50
Course 26, 2,	1 50
Course 76, 1,	1 50
Course 77, 2,	1 50
Course 78, 3,	1 50
Floriculture: —	
Course 50, 1,	2 50
Course 51, 2,	2 50
Course 52, 3,	2 50
Course 53, 1,	2 50
Course 75, 1,	2 00
Course 76, 3,	2 00
Course 77, 2,	2 50
Course 78, 3,	2 50
Forestry: —	
Course 50, 1,	2 00
Course 51, 2,	3 00
Course 75, 1,	4 00
Landscape gardening: —	
Course 50, 1,	3 00
Course 51, 2,	3 00
Course 52, 3,	4 00
Course 76, 2,	4 00
Course 77, 3,	4 00
Course 79, 3,	2 00
Market gardening: —	
Course 50, 3,	2 00
Course 75, 1,	3 00
Course 76, 2,	3 00
Pomology: —	
Course 75, 1,	3 00
Course 76, 2,	3 00

	Per Semester.
Drawing: —	
Course 25, 1,	$3 00
Course 26, 2,	3 00
Botany: —	
Course 3, 3,	3 00
Course 25, 1,	3 00
Course 26, 2,	3 00
Course 50, 1,	3 00
Course 51, 2,	5 00
Course 52, 1,	4 00
Course 53, 2,	4 00
Course 54, 3,	4 00
Course 55, 1,	5 00
Course 56, 2,	5 00
Course 75, 1,	5 00
Course 76, 2,	5 00
Course 77, 3,	5 00
Course 78, 1,	5 00
Course 79, 3,	5 00
Course 80, 3,	5 00
Course 82, 2,	5 00
Course 83, 3,	5 00
Course 84, 2,	5 00
Course 85, 3,	5 00
Entomology: —	
Course 75, 3,	2 00
Course 76, 1,	3 00
Course 77, 2,	3 00
Course 78, 3,	3 00
Chemistry: —	
Course 1, 1,	3 00
Course 2, 2,	3 00
Course 3, 3,	3 00
Course 4, 1,	3 00
Course 5, 2,	3 00
Course 6, 3,	3 00
Course 25, 1,	4 00
Course 26, 2,	4 00
Course 27, 3,	5 00
Course 30, 3,	4 00
Course 51, 1,	5 00
Course 52, 2,	5 00
Course 60, 1,	4 00
Course 61, 2,	5 00
Course 62, 3,	5 00
Course 65, 3,	4 00
Course 76, 1,	5 00
Course 77, 2,	5 00
Course 80, 1,	5 00
Course 90, 2,	5 00
Course 91, 3,	5 00
Course 92, 2,	5 00
Course 93, 3,	5 00
Course 94, 2,	5 00
Course 95, 3,	5 00
Mathematics and engineering: —	
Course 27, 3,	2 00
Course 78, 3,	2 00

	Per Semester.
Microbiology: —	
Course 51, 2 and 3,	$5 00
Course 52, 3,	5 00
Course 75, 2,	5 00
Course 76, 3,	5 00
Course 80, 2,	5 00
Course 81, 1,	5 00
Course 82, 1,	5 00
Course 83, 1,	5 00
Physics: —	
Course 27, 3,	3 00
Course 50, 1,	3 00
Course 51, 2,	3 00
Course 52, 3,	3 00
Veterinary science: —	
Course 78, 1,	2 00
Course 79, 1,	2 00
Course 80, 3,	2 00
Course 85, 1,	2 00
Course 86, 2,	2 00
Course 87, 3,	2 00
Zoölogy and geology: —	
Course 25, 1,	3 00
Course 27, 3,	3 00
Course 50, 1,	3 00
Course 51, 2,	4 00
Course 52, 3,	4 00
Course 53, 1,	4 00
Course 54, 2,	3 00
Course 55, 3,	3 00
Course 75, 1,	3 00
Course 76, 2,	3 00
Course 77, 3,	3 00
Rural journalism: —	
Course 53, 1,	2 00
Course 54, 2,	2 00
Course 55, 3,	2 00
Course 77, 1,	2 00
Course 78, 2,	2 00
Course 79, 3,	2 00
Course 80, 1,	2 00
Course 81, 2,	2 00
Course 82, 3,	2 00
Music (each course),	3 00

Student Aid.

Self Help. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 and preferably $250 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will

find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and sixty or more students are employed at the dining hall.

Application for student labor should be made directly to Kenyon L. Butterfield, president of the college. Applicants are required to present statements from parent or guardian and from a public official or other responsible person of the town or city in which they reside, explaining the necessity of the applicant's need of assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

Special Notice to Needy Students. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each term. This rule is strictly adhered to, and no student will be allowed to complete his registration until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each term at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the term he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the president for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary.

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students: —

Management of the Infirmary.

Supervision.

1. The infirmary is under the *general supervision* of Dr. Charles E. Marshall who is designated as Supervisor of the Infirmary. Miss Florence Levensaler the resident nurse, is in *immediate* charge of the infirmary.

Use of Infirmary.

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as Professor Hicks gives special attention to all student diseases, it

is to be expected that the majority of the students will go to the infirmary at the suggestion of Professor Hicks. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health.

3. Students are urged to consult Professor Hicks or Miss Levensaler immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee.

4. The infirmary fee will be at the rate of $1 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. No charge will be made for miscellaneous treatment of a minor character unless the patient receives one or more meals or remains at the infirmary for one or more nights.

Additional Expenses.

5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient: —

(*a*) *Nurses.* — In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(*b*) *Professional Service.* — If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(*c*) *Supplies.* — Special medical supplies prescribed by a physician or nurse will be charged to the patient. No charge will be made for ordinary medical supplies kept in stock at the infirmary and furnished students in minor cases of illness or accident.

(*d*) *Laundry.* — Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

B. COLLEGE ACTIVITIES.

General Exercises.

Chapel exercises are held two mornings each week. On Wednesday an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about six years ago. All students become members of the union by paying a small fee. The union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study; in the basement of this building there is also a game room for pool and billiards. In the fall and winter months the union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association is active both socially and religiously. Under its direction voluntary Bible classes are conducted during the winter months. A Catholic club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A dramatic club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and basket-ball.

A rifle club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Massachusetts Collegian," published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture and horticulture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Clubs also exist in the Departments of French, Entomology, Floriculture, Landscape Gardening, Zoölogy and Agriculture Economics.

There has recently been organized a Collegiate Country Life Club, the membership of which is composed of faculty and students who are particularly interested in the study of country life problems.

A nonathletics student activities board, composed of alumni, faculty and students, has charge of the finances, schedules, etc., of the musical clubs, dramatic club and student publications.

C. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10. Credit may

sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1914 were: —

Agriculture. — The Grinnell prizes, given by Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, for excellence in theoretical and practical agriculture. Three prizes, $25, $15, $10. The contest is open to those senior students whose record on the registrar's books shows an average standing of 80 or above for the technical work taken in the Divisions of Agriculture and Horticulture during the junior and senior years. Applicants should register with the head of the Division of Agriculture before noon June 2, 1917.

Animal Husbandry. — The F. Lothrup Ames prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

Botany. — The Hills prizes, given by Henry F. Hills of Amherst, amount to $35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, $20; for the second best herbarium, $15. No collection deemed unworthy of a prize will be considered.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character and example.

Public Speaking. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

Equipment.

Agricultural Education. — The courses in this department are planned primarily for those who are preparing to teach. The work is carried on by means of lectures, library and demonstrations. The department has an office, lecture room and a laboratory in the Veterinary Science building. The laboratory is equipped with a balance, dishes, jars, reagent bottles, test tubes, petri dishes, lenses, a Babcock test, a Wisconsin sediment test, Bunsen burner, hot and cold water, electricity, gas and other appliances for giving demonstration and practice lessons in Secondary Agriculture. There is also equipment for conducting children's gardens on the campus. Instruction in school gardens constitutes a part of the practice work of those training for the occupation of teaching. Some practice work in teaching is done in the grammar grades of the Amherst schools, and in the agricultural departments of Hopkins' Academy, and Smith's Agricultural School at Northampton. This department is also intimately related to the matter of recommending candidates for teachers' certificates. At least four courses in the department are required of students preparing for such certificate. The office is supplied with school and college reports, also a large number of pamphlets and bulletins relating to the subject of agriculture in the schools, courses of study, etc. See note relative to teachers' certificates, under major in Agricultural Education.

Agronomy. — The work in agronomy is carried on by means of lecture, laboratory and field work. The soil laboratories are located in the basement of Stockbridge Hall, and include an elementary laboratory with locker equipment for 200 men, and desk space for four divisions of 50 men each, and an advanced soil laboratory for the work of upper classes, with locker space for 80 men. This laboratory is also equipped with balance room, centrifuge room, steam ovens and moisture cabinets. There is also a workroom attached, equipped with power for grinding soils, fodders and the like.

The crop laboratories are located on the second floor of Stockbridge Hall, the room for seed study being at the south end and allowing for sections of 50 men each. The laboratory for cereal and forage crop work is at the north end of the building, and has locker equipment for 64 men. This laboratory is equipped with large steam ovens, constant temperature electric ovens, Brown-Duval moisture apparatus and ovens for seed germination. Attached is a balance room and also a storeroom; while on the fourth floor of Stockbridge Hall is a room equipped for the storage of seed corn, grains and grasses.

Animal Husbandry. — An accurate and definite knowledge of the market types and grades, and of the various breeds of live stock, is fundamental to the work in this department. The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180, and which is fully adapted to the requirements. There are upwards of 125 head of dairy cattle of various ages available for class-room work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Yorkshire pigs are maintained. The college possesses pure-bred Percherons and French coach horses, besides many work teams of different types, which are available for class-room purposes. A set of plaster of Paris

models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different foodstuffs available for the use of the New England farmer, are included in the equipment for this work. An excellent set of upward of 250 lantern slides, portraying the leading prize-winning, producing and breeding animals of the leading breeds, — horses, cattle, sheep and swine, — belongs to this department, and is regularly used in instructional work. This equipment is being added to from time to time as funds are available.

Botany. — The Department of Botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for freshman and sophomore work, and one for junior and senior work; a laboratory for plant physiology, which is well supplied with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc.; and three rooms specially fitted for graduate students. The experiment-station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experimental work and for housing material often needed for instruction.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with modern compound microscopes, dissecting microscopes, microtomes and other apparatus, and a large series of charts. In addition to a physiological laboratory the basement contains a seed and soil room, and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe and other tools and appliances. The herbarium contains about 18,000 sheets of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and over 20,000 specimens of fungi.

Chemistry. — The college Department of Chemistry occupies the entire building previously known as the "old chapel." The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to organic, physiological and physical chemistry, and qualitative analysis. The second floor is occupied by the general lecture room, by offices for the several members of the staff and by laboratories for analytical chemistry. The third floor has been fitted for work in general chemistry, and has desk room and hoods sufficient to accommodate 66 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 100 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

Dairying. — The dairy work is given in Flint Laboratory, a new building designed for the dairy department. It contains large, well-lighted, sanitary and well-equipped laboratories. The equipment is new and of the best types of market milk and farm dairy machines.

Dining Hall. — Draper Hall, a brick colonial building equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college. The building contains a limited number of rooms for young women students.

Drawing. — The class in drawing occupies a room on the second floor of Wilder Hall. It is equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

Entomology. — *General Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped, and it will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room chemical desks and apparatus provide opportunities for the determination of the impurities and adulterations of insecticides. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

Entomology. — *Beekeeping.* — For this work the main office, museum and lecture rooms are in the entomological building. There is also an apiary covering approximately two acres which will consist of about fifty colonies of bees in various types of hives and maintained for the several practical and experimental purposes. The apiary also includes a collection of nectar-yielding plants representative of the native flora as well as of the more impor-

tant nectar sources from other localities. Especial opportunity is therefore given for a study of this fundamental problem of forage. Upon the apiary site is an eight-room building (the first in the world erected exclusively for teaching beekeeping) modeled to meet both the requirements of teaching and of a practical apiary. This building contains a boiler room, capacious wintering cellar, wax extraction room, general carpenter and work shop, laboratory, office, honey extraction room and stock room. The beekeeping equipment also includes an unexcelled collection of apicultural implements, natural history specimens and other curiosities. Practically every device used in American apiculture is available, it being the aim of the department to procure new inventions and implements as fast as they appear for the purpose of study and comparison. Available to the students is a private library of apicultural literature consisting of upwards of 900 volumes and papers, possibly the most complete collection in the country. This entire equipment is acknowledged unique in model and in completeness for the United States and for the world.

Farm Administration. — The college farm of 250 acres is under the general supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

Floriculture. — The Department of Floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a Department of Floriculture better equipped than this. There has been erected a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The Department of Forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distances of the college. The college campus affords an arboretum containing an ex-

ceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects. The recent designation of Mt. Toby as a forest reservation provides more than 700 acres of forest, representing nearly every forest growth within the State.

Geology. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes. The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

Heating, Lighting and Power. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop and well-equipped carpenter shop.

Landscape Gardening. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

Library. — The library — stack room, reading room and office — occupies the entire lower floor of the Chapel-library building. It contains about 53,000 volumes and a large number of bulletins, farm papers and other material, which is being put into good working order as fast as possible. Works on agriculture, horticulture, botany, entomology and the various sciences predominate, but literature, history and sociology are well represented and receive due attention. The reading room provides a good variety of popular and technical periodical literature, encyclopedias and general reference books.

The library is being reclassified and recatalogued in order to make the splendid material accessible and of the greatest working value. Every effort is being made toward developing the college library into a vital intellectual center, of equal value to every student, teacher and teaching department on the college campus. Consequently only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced. An agricultural reference library is maintained in Stockbridge Hall, and department libraries are also maintained in some of the other buildings on the campus.

Occasional lectures are given to regular and short-course students in order to make the best use of the library equipment. Emphasis is laid upon the card catalogue, periodical indexes, bibliographies and guides, and the large collections of United States Department of Agriculture and experiment station literature.

Library hours are from 7.30 A.M. to 9.30 P.M. every week day except Monday and Friday mornings, when the library is open at 8 o'clock, and from 9 A.M. to 1.30 P.M. on Sundays in term time. Shorter hours prevail during vacation.

Market Gardening. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and laboratory particularly equipped for market gardening. A good library of works on vegetable gardening is available.

Mathematics and Civil Engineering. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Microbiology. — The department now occupies a newly erected building and has at command laboratories, research rooms, offices and class-rooms, of thoroughly modern completeness.

Military Science. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

Physical Education. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The main floor is used for basket ball, indoor baseball and hand ball. The gallery has been fitted up as a special exercise and gymnastic room, and is equipped with modern developing apparatus, including parallel bars, horses, bucks, chest weights, dumb-bells, Indian clubs and striking bags. An outdoor board track enables students to secure track practice through the winter, and two ice hockey rinks give ample opportunity for hockey practice. Credit is given to all students taking part in outdoor activities. "Treks" are held twice a week, and whenever possible snowshoe and skiing hikes are also held. Steel lockers and bathrooms have been installed in North and South colleges, and

the gymnasium has been fitted with a shower-room. The gymnasium classes are held the last two hours in the morning and the last two hours in the afternoon, but students may use the gymnasium at other times for exercise purposes by arrangement with the department. The regulation costume for class exercise consists of a white track suit and white rubber-sole shoes.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Pomology. — The Department of Pomology has 45 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There are also two commercial vineyards, and a smaller one in which are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples, plums, pears and peaches, in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1912–13, for instance, apples for class use were received from Idaho, Missouri, Utah, Washington, Maine, Connecticut, Pennsylvania, Montana, Minnesota, Nebraska, Kentucky, Iowa, Wisconsin, Michigan, New York, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrus fruit from Florida and Texas. From the college fruit plantations the following fruits were available: grapes, fifty varieties, representing three native American species and several hybrids; twenty varieties of peaches, twenty varieties of pears, twenty-five varieties of plums, eighty varieties of apples.

Poultry Husbandry. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well

drained. At present the buildings consist of an incubator cellar, 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, cramming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; a combination laying, testing and breeding house, 18 by 72, for experimental purposes, and a model laying house, 18 by 30, for 100 hens; the 6 old experiment-station buildings, each 12 by 18 feet, to be used as breeding houses; 14 colony houses; 8 growing crops; a manure shed, 14 by 18 feet; and an oil house, 10 by 12 feet. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chickens, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

Public Speaking. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests offer a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollegiate contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

Rural Engineering. — This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings. A set of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The rural engineering shop building is a one-story structure 68 by 126 feet. The carpenter shop in this building is fitted with benches fully equipped with tools for each student. A saw table is available for getting out material. The general repair shop is equipped with forges, benches, a drill press and grinders. The laboratory for farm machinery and farm motors is equipped with a complete line of field machines, gasoline engines and pumps. A small dynamo and switchboard are used in the study of farm-lighting systems.

The work on the small field machines is given in the basement of Stockbridge Hall, and the work on steam engines and steam heating is given in Flint Laboratory.

Rural Journalism. — The news-room, or laboratory, for the courses in rural journalism, is equipped with typewriting machines, copy tables, representative newspapers, reviews, agricultural papers, and trade journals concerning journalism and writing, selected books on journalism, reference books,

and a considerable "morgue" of indexed pamphlets, monographs and clippings on farming, rural life and rural industry, contemporary events, etc. (loan collection). The news-room and offices are in the recently completed Stockbridge Hall, near the division library of the Division of Agriculture.

Veterinary Science. — The Department of Veterinary Science occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the Departments of Entomology and Zoölogy-Geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 3 floor cases with space for 9 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 6 P.M. The curator is Associate Professor Gordon.

List of Awards and Prizes, 1916.

Grinnell Prizes. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations,

oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, $25, awarded to Harold Augustus Mostrom.

Second prize, $15, awarded to Ralph Fred Taber.

Third prize, $10, awarded to Raymond Alson Mooney.

General Improvement. — The Western Alumni Association prize, given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example, $25. Awarded to Ralph Walter Hurlburt, 1918.

Hills Botanical Prizes. — Hills prizes for the best and second best herbarium, competition open to members of the senior, junior and sophomore classes, were awarded as follows: —

First prize of $20 to Roger Francis Clapp of the sophomore class.

Second prize of $15 to Carlton McIntyre Stearns of the junior class.

Public Speaking. — The Burnham prizes were awarded to the students delivering the best and second best declarations, as follows: —

First prize, $15, awarded to Henry John Burt, 1919.

Second prize, $10, awarded to Fred Bucknam Sampson, 1918.

The Flint prizes were awarded to the students delivering the best and second best orations, as follows: —

First prize, $20, awarded to Theodore Henry Reumann, 1918.

Second prize, $15, awarded to Lincoln David Kelsey, 1917.

Interclass Debate. — Won by the Freshman Debating Team, composed of Robert Burleigh Collins, James Joseph Window and Henry John Burt, — silver cup to each.

College Prize Debate. — Lincoln David Kelsey, 1917, Henry John Burt, 1919, and Thomas Lincoln Harrocks, 1916, — $15 to each.

Military Honors. — The following-named cadet officers have been granted the military diploma, and have been reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts as being efficient in military science and tactics and graduating therein with highest honors: —

Cadet Col. Charles Edward Hathaway, Jr.
Cadet Maj. Albert James Hicks.
Cadet Maj. Charles Albert Huntington, Jr.
Cadet Capt. Harold Aiken.
Cadet Capt. Emilio Joseph Cardarelli.
Cadet Capt. George Newlon Danforth.
Cadet Capt. Frank Eugene Haskell.
Cadet Capt. Stanley Marshall Prouty.
Cadet Capt. Everett Stackpole Richards.
Cadet Capt. Dean Albert Ricker.
Cadet Capt. Benjamin Charles Louis Sander.
Cadet Capt. Raymond Scott Wetherbee.

Rural Drama Prize. — A prize of $50 was offered jointly by Prof. E. L. Morgan and the Dramatic Society for the best rural drama produced by a member of the undergraduate student body. Awarded to Mr. Thomas Carlton Upham of the class of 1916.

Secretaries of Alumni Associations.

Associate Alumni of the Massachusetts Agricultural College.
Secretary: Dr. CHARLES A. PETERS, 1897, Amherst, Mass.
Alumni Secretaries' Association of the Massachusetts Agricultural College.
Secretary: RALPH J. WATTS, 1907, Amherst, Mass.
Alumni Club of Massachusetts.
Secretary: EDWARD C. EDWARDS, 1914, 50 State Street, Boston, Mass.
Connecticut Valley Association of the Massachusetts Agricultural College.
Secretary: ROBERT S. FAY, 1913, Monson, Mass.
Massachusetts Agricultural College Club of New York.
Secretary: Dr. JOHN ASHBURTON CUTTER, 1882, 266 West Seventy-seventh Street, New York City.
Massachusetts Agricultural College Club of Washington, D. C.
Secretary: G. A. BILLINGS, U. S. D. A., Office of Farm Management, Washington, D. C.
Western Alumni Association of the Massachusetts Agricultural College.
Secretary: CHARLES A. TIRRELL, 1906, 815 Steinway Hall, Chicago, Ill.
Massachusetts Agricultural College Pacific Coast Alumni Association.
Secretary: THOMAS F. HUNT, 1905, Berkeley, Cal.
Massachusetts Agricultural College Club of Hawaii.
President: ALLEN M. NOWELL, 1897, Honolulu, T. H.
Massachusetts Agricultural College Club of Worcester County.
Secretary: CHARLES H. WHITE, 1909, 11 Foster Street, Worcester, Mass.
Massachusetts Agricultural College Club of Marlborough.
Secretary: WILLIAM L. HOWE, 1908, Marlborough, Mass.
Massachusetts Agricultural College Club of Connecticut.
Secretary: HERBERT J. BAKER, 1911, Storrs, Conn.

Class Secretaries.

Class of —	Secretary.	Secretary's Address.
1871	E. E. Thompson,	5 Jacques Avenue, Worcester, Mass.
1872	F. E. Kimball,	17 Harvard Street, Worcester, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	D. G. Hitchcock,	Warren, Mass.
1875	P. M. Harwood,	Room 136, State House, Boston, Mass.
1876	C. Fred Deuel,	Amherst, Mass.
1877	Atherton Clark,	231 Waverley Avenue, Newton, Mass.
1878	C. O. Lovell,	201 Darke Block, Regina, Saskatchewan, Can.
1879	R. W. Swan,	41 Pleasant Street, Worcester, Mass.
1880	Alvan L. Fowler,	413 Federal Building, Philadelphia, Pa.
1881	J. L. Hills,	59 North Prospect Street, Burlington, Vt.
1882	G. D. Howe,	38 Whittier Avenue, Springfield, Mass.
1883	J. B. Lindsey,	Amherst, Mass.
1884	E. A. Jones,	New Canaan, Conn.
1885	E. W. Allen,	1923 Biltmore Street, Washington, D. C.
1886	Winfield Ayres,	616 Madison Avenue, New York City.

Class Secretaries — Concluded.

Class of —	Secretary.	Secretary's Address.
1887	F. H. Fowler,	Shirley, Mass.
1888	H. C. Bliss,	14 Mechanic Street, Attleboro, Mass.
1889	F. W. Davis,	85 Colberg Avenue, Roslindale, Mass.
1890	David Barry,	398 Walnut Street, Newtonville, Mass.
1891	H. T. Shores,	177 Elm Street, Northampton, Mass.
1892	H. M. Thomson,	Amherst, Mass.
1893	F. A. Smith,	Hathorne, Mass.
1894	S. F. Howard,	Northfield, Vt.
1895	E. A. White,	Ithaca, N. Y.
1896	A. S. Kinney,	South Hadley, Mass.
1897	C. A. Peters,	Amherst, Mass.
1898	W. S. Fisher,	Peace Street Grammar School, Providence, R.I.
1899	Herbert W. Dana,	9 Oliver Street, Salem, Mass.
1900	E. K. Atkins,	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass.
1902	H. L. Knight,	1420 Buchanan Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	East Holliston, Mass.
1905	A. D. Taylor,	1900 Euclid Avenue, Cleveland, Ohio.
1906	Richard Wellington,	2314 Scudder Street, St. Paul, Minn.
1907	Clinton King,	31 Elm Street, Springfield, Mass.
1908	S. J. Wright,	39 Wall Street, Norwalk, Conn.
1909	O. B. Briggs,	1011 Fidelity Building, Baltimore, Md.
1910	F. L. Thomas,	Auburn, Ala.
1911	L. M. Johnson,	Newtown, Conn.
1912	F. S. Madison,	East Greenwich, R. I.
1913	B. W. Ellis,	575 Main Street, South Weymouth, Mass.
1914	L. Ernest Smith,	Pittsford, Vt.
1915	P. F. Whitmore,	Sunderland, Mass.
1916	Perez Simmons,	34 Boylston Street, Pittsfield, Mass.

Degrees Conferred and Roll of Students.

Degrees Conferred — 1916.

Doctor of Philosophy (Ph.D.).

Chapman, George Henry, Amherst, Mass., Massachusetts Agricultural College, M.Sc.
Itano, Arao, Okayamakan, Japan, Michigan Agricultural College, B.Sc.
Ruprecht, Rudolph W., Flatbush, N. Y., Massachusetts Agricultural College, M.Sc.

Master of Science (M.Sc.).

Armstrong, Robert Pierson, Rutherford, N. J., Massachusetts Agricultural College, B.Sc.
Beals, Carlos Loring, Sunderland, Mass., Massachusetts Agricultural College, B.Sc.
Lund, Russell Fort, Amherst, Mass., St. Lawrence University, A.B.
Serex, Paul, Jr., Bloomfield, N. J., Massachusetts Agricultural College, B.Sc.
Thurston, Arthur Searle, Everett, Mass., Massachusetts Agricultural College, B.Sc.

Bachelor of Science (B.Sc.).

Aiken, Harold,	Millis.
Anderson, Frank Albert,	Somerville.
Andrews, Francis Marshall, Jr.,	Manchester.
Barnes, Dwight Fletcher,	Bedford.
Barnes, Fred Leslie Walker,	Plymouth.
Bishop, Herbert Walker,	Doylestown, Pa.
Blanpied, Nelson Uhler,	Framingham.
Boyer, Edward Everett Hale,	Lynn.
Brazil, William Henry,	Leominster.
Caldwell, Harold Nute,	Lowell.
Cardarelli, Emilio Joseph,	Boston.
Chase, Esther Helen,	Holden.
Chisholm, Raymond Lincoln,	Melrose Highlands.
Clapp, Raymond Luckey,	Northfield.
Clark, Saxon Dickinson,	Springfield.
Coe, Alfred Lynn,	Fayetteville, N. Y.
Coleman, Albert Sumner,	Mendon.
Coley, William Stanton,	Wilton, Conn.
Courchene, Alcide Telesphor,	North Adams.
Curran, Harry Ambrose,	Marlborough.
Danforth, George Newlon,	Foxcroft, Me.
Darling, Homer Chester,	Mendon.
Davis, Frank Leslie,	Milford.
Dickinson, William Cowls,	North Amherst.
Dodge, Walter Eugene,	Geneva, Ohio.
Eldredge, Raymond Chase,	North Abington.
Estes, Ralph Cary,	South Framingham.
Fernald, Charles Henry, 2d,	Amherst.
Fielding, Lester Edward,	Malden.
Gaventa, Harry Reymer,	Swedesboro, N. J.
Gilmore, Benjamin Anthony,	Acushnet.
Gioiosa, Alfred Anthony,	Dorchester.
Glover, Theodore Whitford,	South Duxbury.
Goodwin, Clinton Foster,	Haverhill.
Googins, Burton,	Jersey City, N. J.
Gould, Charles Holt,	Hubbardston.
Gunn, Carlton Merrick,	Sunderland.
Hager, Clayton Marden,	Somerville.

Hall, Stanley William,	Saxonville.
Harris, William Lombard, Jr.,	Deerfield.
Harrocks, Thomas Lincoln,	Westminster.
Hart, Reginald,	Montague City.
Haskell, Frank Eugene,	Northborough.
Hathaway, Charles Edward, Jr.,	Somerset.
Hemenway, Justin Stanley,	Williamsburg.
Hendry, Arthur Ekman,	Milton.
Hicks, Albert James,	Amherst.
Holden, Mae Faustina,	Royalston.
Huntington, Charles Albert, Jr.,	Poquonock, Conn.
Jerome, Fred William,	Stockbridge.
Jones, Linus Hale,	Milford.
Jordan, Perley Balch,	Topsfield.
Kelly, Harold Russell,	Haverhill.
Kilbon, Ralph Gillette,	Springfield.
King, Edward Lee,	Norwood.
Knapton, Guy Lord,	Lawrence.
Laird, Kenneth Bradford,	Brockton.
Lieber, Conrad Hugo,	Jamaica Plain.
Lindquist, Albert Evert,	Roxbury.
Little, Harold Greenleaf,	Newburyport.
Locke, Wilbur Trow,	Lawrence.
Mahan, Harold Butterworth,	Manchester, N. H.
Mattoon, Harold Gleason,	Pittsfield.
Mooney, Raymond Alson,	Plattsburgh, N. Y.
Moses, Charles Wicker,	Ticonderoga, N. Y.
Mostrom, Harold Augustus,	North Middleborough.
Murphy, John William,	Beverly.
Nash, Clayton Wells,	South Weymouth.
Nicholson, James Thomas,	Leominster.
Palmer, George Bradford,	Brookline.
Perry, Edgar Adams,	Attleboro.
Plaisted, Philip Asbury,	Arlington.
Potter, David,	Concord.
Prouty, Stanley Marshall,	North Brookfield.
Ray, George Burrill,	Hingham.
Rich, Gilbert Warren,	Hingham.
Richards, Everett Stackpole,	Hatfield.
Ricker, Dean Albert,	Worcester.
Rogers, Tyler Stewart,	Framingham.
Rowe, Louis Victor,	Melrose.
Russell, Ernest Samuel,	South Hadley.
Ryan, William Edward, Jr.,	Stoughton.
Sander, Benjamin Charles Louis,	Cambridge.
Sanderson, Everett Shovelton,	Centreville, R. I.
Scheufele, Frank Joseph,	South Natick.
Schlotterbeck, Lewis,	Roxbury Station, Conn.
Simmons, Perez,	Pittsfield.
Stearns, Frederick Campbell,	Waltham.
Strauss, Abraham,	Roxbury.
Swan, Durelle,	Dorchester.
Taber, Ralph Fred,	Cooperstown, N. Y.
Taft, Richard Craig,	Oxford.
Topham, Alfred,	Lawrence.
Upham, Thomas Carlton,	Fitchburg.
Verbeck, Howard Graves,	Malden.
Walkden, Herbert Halden,	Westford.
Walker, Henry Marshall,	Brookline.
Wentworth, Everett Lawrence,	East Dover, Vt.
Wetherbee, Raymond Scott,	Waltham.
Whitney, Leon Fradley,	Brooklyn, N. Y.
Wildon, Carrick Earl,	Melrose Highlands.
Woolley, Harold Curtis,	Malden.

Roll of Students.

Graduate Students.[1]

Alden, Charles H., ... Amherst.
B.Sc., Massachusetts Agricultural College.

Armstrong, Robert Pierson, ... Rutherford, N. J.
B.Sc., Massachusetts Agricultural College.
M.Sc., Massachusetts Agricultural College.

Avery, Roy Crowdy, ... New York City.
B.Sc., Connecticut Agricultural College.

Bain, E. S., ... Martinsville, Ind.
B.S.Ag., Purdue University.

Bales, Harold C., ... South Deerfield.
A.B., Dartmouth College.

Beebe, Paul, ... Ithaca, Mich.
A.B., Albion College.

Bemis, Willard G., ... North Brookfield.
B. Sc., Massachusetts Agricultural College.

Bourne, Arthur Israel, ... Amherst.
A.B., Dartmouth College.

Bronson, Wesley Hotchkiss, ... Amherst.
B.Sc., New York State College of Agriculture.

Caruthers, John T., ... Nashville, Tenn.
B.Sc., Massachusetts Agricultural College.

Chapin, Edward Albert, ... Springfield.
Ph.B., Sheffield Scientific School.

Clapp, Raymond K., ... Easthampton.
B.Sc., Massachusetts Agricultural College.

Cobb, J. Stanley, ... Groton, N. Y.
B.Sc., Cornell University.

DeVault, Samuel Henry, ... Jonesboro, Tenn.
A.B., Caron Newnan College.
A.M., University of North Carolina.

Dickinson, William Cowls, ... Amherst.
B.Sc., Massachusetts Agricultural College.

Doran, William Leonard, ... North Dartmouth.
B.Sc., Massachusetts Agricultural College.

Drain, Harry D., ... Belpre, Ohio.
B.S.A., Ohio State University.

Etter, Art Edward, ... Monroe, Wis.
A.B., University of Wisconsin.

Fernald, Charles H., 2d, ... Amherst.
B.Sc., Massachusetts Agricultural College.

Fish, Ernest Ellsworth, ... Wyalusing, Pa.
B.Sc., Pennsylvania State College.

Fletcher, Arthur George, ... Orleans, Vt.
A.B., Harvard.

Hood, Egerton Gibson, ... Hagermon, Ontario, Can.
B.S.A., Toronto University.

[1] Enrollment from September, 1916, to January, 1917, inclusive. The list therefore does not represent the complete enrollment since Dec. 1, 1915.

Hubert, Benjamin F., ... Orangeburg, S. C.
B.Sc., Massachusetts Agricultural College.
Jones, Linus H., ... Milford.
B.Sc., Massachusetts Agricultural College.
Kelly, Harold R., ... Haverhill.
B.Sc., Massachusetts Agricultural College.
Kilham, Austin D., ... Springfield, Mo.
A.B., Drury College.
B.Sc. in agriculture, University of Missouri.
Knapton, Guy Lord, ... Lawrence.
B.Sc., Massachusetts Agricultural College.
MacNeil, Ralph Langdel, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Mardfin, Emile, ... New York City.
B.Sc., Cornell University.
McNamara, M. J., ... Stoughton.
M.Sc., Massachusetts Agricultural College.
Merkle, Frederick Grover, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Morgan, Ezra L., ... Amherst.
A.B., McKendree College.
M.A., University of Wisconsin.
Mutkekar, Satwaji Gundoji, ... Belgaum, Ind.
B.Agr., Poona Agricultural College.
Nash, Clayton W., ... South Weymouth.
B.Sc., Massachusetts Agricultural College.
Noyes, Henry Alford, ... Lafayette, Ind.
B.Sc., Massachusetts Agricultural College.
M.Sc., Massachusetts Agricultural College.
Pauley, William C., ... Lafayette, Ind.
B.Sc. in agriculture, Purdue University.
Peacock, Walter Miller, ... Bridgeton, N. J.
B.S., Cornell University.
M.S.A., Cornell University.
Peckham, Curtis, ... New Bedford.
B.Sc., Massachusetts Agricultural College.
Perry, Gerald Eugene, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Porter, Bennet Allen, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Prince, Arthur Leslie, ... Webster.
A.B., Clark College.
Purington, James A., ... Hopkinton, N. H.
B.Sc., New Hampshire College of Agriculture.
Ray, George Burrili, ... Hingham.
B.Sc., Massachusetts Agricultural College.
Root, Irving C., ... Kansas City, Kan.
B.Sc., Kansas State Agricultural College.
Rutledge, Ralph M., ... Amherst.
B.Sc., Oregon Agricultural College.
M.S., University of Wisconsin.
Serex, Paul, Jr., ... Bloomfield, N. J.
B.Sc., Massachusetts Agricultural College.
M.Sc., Massachusetts Agricultural College.
Stewart, Lloyd L., ... Darlington, Ind.
B.Sc. in agriculture, Purdue University.
Thompson, W. Bradley, ... Orange, N. J.
A.B., Williams College.
Vinal, Stuart C., ... East Weymouth.
B.Sc., Massachusetts Agricultural College.
Wheeler, John T., ... Amherst.
B.S.A., University of Wisconsin.

White, Donald, ... Wakefield.
A.B., Harvard College.
White, Henry Harrison, ... Amherst.
B.Sc., Massachusetts Agricultural College.
Wies, Calmy, ... Malden.
B.Sc., Massachusetts Agricultural College.
Wildon, Carrick E., ... Melrose Highlands.
B.Sc., Massachusetts Agricultural College.
Wood, Elwin G., ... Bigfork, Mont.
B.Sc., Washington State College.
Woodman, Allison Morris, ... Berkeley, Cal.
B.Sc. in agriculture, University of California.

In Absentia.

Davies, Ernest Langford, ... Guelph, Can.
B.Sc., Ontario Agricultural College.
Fletcher, Arthur George, ... Orleans, Vt.
A.B., Harvard College.
Noyes, Harry Alfred, ... Lafayette, Ind.
B.Sc., Massachusetts Agricultural College.
M.Sc., Massachusetts Agricultural College.

CLASS OF 1917.

Babcock, Philip Rodney,[1]	Lynn,	Kappa Sigma.
Behrend, Oswald,	Natick,	Commons Club.
Bell, Alfred Whitney, Jr.,	West Newton,	53 Lincoln Avenue.
Boles, Robert Stewart,	Dorchester,	Beta Kappa Phi.
Bonn, Wesley Copeland,	Grafton,	Commons Club.
Booth, Alfred,	Campbell Hall, N. Y.,	12 South College.
Boyce, Harold Prescott,[1]	Haverhill,	14 South College.
Buckman, Lewis Taylor,	Wilkes-Barre, Pa.,	13 South College.
Buttrick, David Herbert,	Arlington,	Phi Sigma Kappa.
Carruth, Glenn Howard,[1]	Orange,	3 North College.
Chamberlin, Frank Shirley,	Framingham,	18 Nutting Avenue.
Clough, Charles Henry,	Dedham,	11 North College.
Cross, Walter Irving,	Hingham Center,	6 North College.
Curtin, Charles Warren,	Newton,	10 Hallock Street.
Davis, Monsell Henry,	Orange, N. J.,	16 North College.
Day, James Harold,	Hatfield,	85 Pleasant Street.
Dempsey, Paul Wheeler,	Dorchester,	15 North College.
Dickey, Harold Gammell,	Dorchester,	8 South College.
Dillon, Thomas Stevenson,[1]	West Warren,	Aggie Inn.
Dizer, John Thomas,	East Weymouth,	East Experiment Station.
Duffill, Edward Stanley,	Melrose Highlands,	8 Allen Street.
Dunham, Henry Gurney,	West Bridgewater,	11 North College.
Edwards, Francis Gill,[1]	Beverly,	Phi Sigma Kappa.
Elliot, Ralph William,	Chartley,	Flint Laboratory.
Everbeck, George Charles,[1]	Boston,	1 South College.
Fearing, Ralph Watson,	Dorchester,	3 North College.
Flagg, Wayne McCrillis,	Mittineague,	Beta Kappa Phi.
Flint, Oliver Simeon,	Lowell,	120 Pleasant Street.
Goldstein, Maurice,	Lynn,	10 North College.
Graham, Leland Jenkins,	Amherst,	Lincoln Avenue.
Grayson, Emory Ellsworth,[1]	Milford,	Alpha Sigma Phi.
Gurshin, Carl Alfred,	Lynn,	Kappa Sigma.
Hagelstein, Charles Henry,	Dorchester,	14 South College.
Harlow, Frank Edward,[1]	Malden,	10 North College.
Harlow, Paul Goodhue,	Malden,	Phi Sigma Kappa.
Henninger, Roswell Woodward,	Williamsport, Pa.,	87 Pleasant Street.

[1] Work incomplete.

Higginbotham, Harry,	Taunton,	3 South College.
Hill, Edmund Baldwin,	Rutherford, N. J.,	Alpha Sigma Phi.
Holden, Richard Lynde,	Haverhill,	11 South College.
Holder, Ralph Clifton,	Farmington, N. H.,	17 Kellogg Avenue.
Hubbell, Franklin Homer,	Westport, Conn.,	14 South College.
Irving, William Raymond,	Taunton,	13 South College.
Kelsey, Edmund Dean, [1]	Amherst,	Commons Club.
Kelsey, Lincoln David,	West Hartford, Conn.,	90 Pleasant Street.
Kinsman, Alfred Oberlin, Jr.,	Merrimac,	Mathematics Building.
Larson, Frederick Christian, [1]	Everett,	12 South College.
Latham, Paul Walker,	Norwichtown, Conn.,	12 North College.
Lawrence, Milford Robinson,	Falmouth,	Kappa Sigma.
Light, Brooks, [1]	Brookline,	4 South College.
Loring, Albert Briggs,	Nantasket Beach,	16 North College.
Lydiard, Harry Crowther,	Hartford, Conn.,	Colonial Inn.
Mack, Walter Adams,	Springfield,	15 South College.
MacLeod, Daniel Johnston, [1]	Wakefield,	Hillside Avenue, R. F. D. No. 126.
Marchant, Horace Greenough,	Cambridge,	5 North College.
Mayo, Frank Willard, [1]	Houlton, Me.,	Phi Sigma Kappa.
Mayo, William Irving, Jr.,	Framingham Center,	Experiment Station Farm House.
McNamara, Michael Joseph, [1]	Stoughton,	Stockbridge Hall.
Merrill, Dana Otis,	East Pepperell,	10 North College.
Moorhouse, Newell,	Worcester,	9 South College.
Nash, Herman Beaman,	Amherst,	13 North College.
Nelson, John Brockway,	Newburyport,	15 South College.
Noyes, Samuel Verne,	Georgetown,	11 North College.
Pierce, Harold Barnard,	Kansas City, Mo.,	80 Pleasant Street.
Pratt, Harold Arthur,	Shrewsbury,	M. A. C. Plant House.
Quimby, Charles Frederick,	Cape Neddick, Me.,	83 Pleasant Street.
Randall, Earle MacNeill,	Winchester,	11 South College.
Richardson, Lewis Elmer,	Rockville,	11 South College.
Rodger, Raymond Miller, [1]	Everett,	16 South College.
Rogers, Roland Winsor,	Braintree,	12 South College.
Rorstrom, Hans Alfred,	Boston,	Experiment Station Farm House.
Ross, Louis Warren, [1]	Boston,	Phi Sigma Kappa.
Saidel, Harry Samuel, [1]	Worcester,	101 Pleasant Street.
Sargent, George Leonard,	Merrimac,	4 North College.
Saunders, William Putnam,	Lawrence,	20 South College.
Sauter, John Martin,	Turners Falls,	13 North College.
Saville, William, Jr.,	Waban,	7 South College.
Schaefer, Leonard Charles,	Holyoke,	Entomology Building.
Schwab, Andrew Nathan,	Yalesville, Conn.,	French Hall.
Selkregg, Edwin Reimund, [1]	Northeast, Pa.,	North College.
Shumway, Paul Edward,	Greenfield,	3 South College.
Sims, James Stanley, [1]	Melrose,	20 South College.
Smith, Herbert Dwight, [1]	Amherst,	60 Pleasant Street.
Smith, Richard Woodworth,	Pittsfield,	12 North College.
Spaulding, Almon Whitney,	Newton Highlands,	16 South College.
Squires, Paul Revere,	Belchertown,	85 Pleasant Street.
Stearns, Carlton McIntyre, [1]	Melrose,	15 Phillips Street.
Stiles, Albert Ralph, [1]	Arlington Heights,	7 South College.
Stowell, Harold Thurber,	Amherst,	193 South Pleasant Street.
Thayer, William Wallace,	Somerville,	Lambda Chi Alpha.
Tuthill, Samuel Fuller,	Mattapoisett,	16 South College.
Upson, Everett Langdon,	New Britain, Conn.,	4 South College.
Walbridge, Henry Blood,	Bennington, Vt.,	4 North College.
Warner, Merrill Pomeroy, [1]	Sunderland,	8 South College.
Warren, Harold Manson, [1]	Melrose,	1 South College.
Warren, James Joseph,	North Brookfield,	3 North College.

[1] Work incomplete.

Webster, Frank Cedric,	Harvard,	Mathematics Building.
Westman, Robert Clayton, [1]	Roslindale,	15 South College.
Whitcomb, Warren Draper,	Waltham,	88 Pleasant Street.
Whitney, Joseph Fradley,	Westminster,	Kappa Sigma.
Wies, Calmy,	Malden,	31 Pleasant Street.
Wilber, Charles Raymond,	Walpole,	6 North College.
Wilcox, Timothy Palmer,	Andover,	1 North College.
Williams, Arthur Franklin,	Sunderland,	10 South College.
Williams, Herbert Clifton,	South Hadley Falls,	Birch Lawn.

Class of 1918.

Additon, Elizabeth Emery, [1]	Newton Center,	Draper Hall.
Babbitt, George King, [1]	Boston,	85 Pleasant Street.
Bainbridge, Frank Benedict, [1]	Paterson, N. J.,	5 South College.
Baker, Foster Kenneth,	Fairhaven,	Entomology Building.
Baker, Henry Raymond,	Amherst,	West Street.
Barton, George Wendell,	North Sudbury,	36 North Prospect Street.
Binks, Frank Joseph, [1]	Maynard,	Beta Kappa Phi.
Boaz, William Henry,	Covesville, Va.,	Phi Sigma Kappa.
Boyd, Robert Lucius, [1]	Lynn,	Colonial Inn.
Bruce, Walter Griffith,	Springfield,	21 Fearing Street.
Buchanan, Walter Gray,	Chicopee,	97 Pleasant Street.
Canlett, Franklin Harwood,	Bedford,	36 North Prospect Street.
Carlson, Fred Albert,	Pittsfield,	84 Pleasant Street.
Carter, Thomas Edward, [1]	West Andover,	82 Pleasant Street.
Chamberlain, Sumner Fiske, [1]	Holden,	83 Pleasant Street.
Chambers, Roger James,	Dorchester,	9 North College.
Chapman, John Alden,	Salem,	Phi Sigma Kappa.
Clapp, Roger Francis,	Salem,	79 Pleasant Street.
Clark, Stewart Sandy, [1]	Holyoke,	Chemistry Laboratory.
Cotton, Elwyn Page, [1]	Woburn,	87 Pleasant Street.
Davis, Albert Noah, [1]	Somers, Conn.,	4 Chestnut Street.
Davis, Dwight Shaw, [1]	Woburn,	Commons Club.
Dowd, William Lawrence, [1]	North Amherst,	North Amherst.
Duncan, George James, [1]	Arlington,	101 Pleasant Street.
Dunn, Arthur Paul, [1]	Malden,	90 Pleasant Street.
Edes, David Oliver Nourse,	Bolton,	82 Pleasant Street.
Ellis, Ralph Chick, [1]	West Newton,	Colonial Inn.
Emmerich, Louis Philip, [1]	Paterson, N. J.,	6 South College.
Erickson, George Edwin,	Campello,	Lincoln Avenue.
Faneuf, Leo Joseph, [1]	West Warren,	Birch Lawn.
Farrar, Delwin Bruce, [1]	Amherst,	1 Dana Street.
Fellows, Harold Carter, [1]	Peabody,	Commons Club.
Ferris, Adaline Lawson, [1]	Ridgefield Park, N. J.,	Draper Hall.
Foley, William Albert,	Palmer,	35 North Prospect Street.
Foster, Hamilton Knight, [1]	New Rochelle, N. Y.,	4 Lessey Street.
Foster, Roy Wentworth,	Lynn,	82 Pleasant Street.
Francis, Donald Smith, [1]	Athol,	Beta Kappa Phi.
Fraser, Charles Allen, [1]	Plymouth,	Kappa Sigma.
Frellick, Arthur Lester, [1]	Everett,	13 Phillips Street.
Fuller, Camille Baldwin, [1]	West Quincy,	Commons Club.
Gasser, Thomas Jefferson,	Uxbridge,	Alpha Sigma Phi.
Gifford, Flavel Mayhew,	West Tisbury,	6 Nutting Avenue.
Gillette, Nathan Warner, [1]	Revere,	5 South College.
Goodridge, George Lucien, [1]	Melrose,	82 Pleasant Street.
Goodwin, William Irving, [1]	Bradford,	82 Pleasant Street.
Gordon, Frederick George, [1]	Plymouth,	Birch Lawn.
Gray, Milton Berford,	Woods Hole,	13 Phillips Street.
Grayson, Forrest,	Milford,	1 North College.

[1] Work incomplete.

Haines, Foster Kingsley,	Peabody,	120 Pleasant Street.
Hance, Forrest Sansbury,[1]	Paterson, N. J.,	Colonial Inn.
Harwood, Ralph Wallace,	Barre,	Phi Sigma Kappa.
Hawley, Robert Dorman,	Springfield,	Phi Sigma Kappa.
Hayes, Olin Henry,[1]	Lawrence,	7 Nutting Avenue.
Heffron, Paul John,[1]	Sherborn,	Birch Lawn.
Higgins, Leo Clement,[1]	Amesbury,	24 Beston Street.
Hilliker, Harriett Franklin,[1]	East Lynn,	9 Phillips Street.
Holmes, George Frederick,	Ipswich,	60 Pleasant Street.
Holmes, Robert Palmer,[1]	Wakefield,	Aggie Inn.
Howard, Arthur Merchant,	Pittsfield,	84 Pleasant Street.
Howe, Albert Edward,[1]	Needham,	Lincoln Avenue.
Howes, Donald Francis,	Ashfield,	Birch Lawn.
Hunnewell, Paul Fiske,	Winthrop,	Phi Sigma Kappa.
Huntoon, Douglas Henderson,	Norwood,	Phi Sigma Kappa.
Hurlburt, Ralph Walter,	Ashley Falls,	94 Pleasant Street.
Illman, Margaret Keble,[1]	Schuyler Falls, N. Y.,	Draper Hall.
Ingalls, Irving Weaver,[1]	Brooklyn, N. Y.,	Beta Kappa Phi.
Jepsky, Abraham,	Medway,	Birch Lawn.
Johnson, Birger Lars,[1]	Dorchester,	29 McClellan Street.
Kennedy, Carl Francis,[1]	Milford,	85 Pleasant Street.
Lanphear, Marshall Olin,	Windsor, Conn.,	96 Pleasant Street.
Lawrence, Lewis Henry,[1]	Falmouth,	79 Pleasant Street.
Lawton, Ralph Wilber,[1]	Fall River,	17 Fearing Street.
Leonard, Ralph Stanley,[1]	Melrose,	82 Pleasant Street.
Levine, Darwin Solomon,	Sherborn,	11½ Amity Street.
Lipshires, David Mathew,	Roxbury,	Flint Laboratory.
Loring, William Rupert,	Great Barrington,	Physics Building.
Lyons, Louis Martin,	Rockland,	East Experiment Station.
Maginnis, John Joseph,[1]	Lawrence,	Alpha Sigma Phi.
Mallorey, Alfred Sidney,[1]	Lynn,	15 Hallock Street.
Marshall, Max Skidmore,	Amherst,	44 Sunset Avenue.
McKee, William Henry,[1]	Chelsea,	M. A. C. Store.
McNaught, Warren Henry,	Plymouth,	Colonial Inn.
McRae, Herbert Rankin,[1]	Malden,	4 Nutting Avenue.
Messenger, Kenneth Leroy,	Winsted, Conn.,	Kappa Sigma.
Millard, Harold Baldwin,	Great Barrington,	Veterinary Building.
Minor, John Bacon, Jr.,[1]	New Britain, Conn.,	Kappa Sigma.
Mitchell, Edward Nahum,[1]	Medford,	Phi Sigma Kappa.
Mitchell, Theodore Bertis,	Needham,	15 North College.
Mower, Carl Taft,[1]	Montpelier, Vt.,	Kappa Sigma.
Moynihan, Patrick Joseph,[1]	Holyoke,	Alpha Sigma Phi.
Newton, Gaylord Arthur,	Durham, Conn.,	21 Fearing Street.
Norcross, Gardner Clyde,	Brimfield,	35 East Pleasant Street.
Odams, Lester Nichols,	Salem,	79 Pleasant Street.
Oertel, August Leonard,	South Hadley Falls,	Birch Lawn.
O'Heron, Francis James,[1]	East Milton,	5 North College.
O'Neill, Oliver Maurice,	Dorchester,	29 McClellan Street.
Patch, Lawrence Henry,	Wenham,	Plant House.
Petit, Arthur Victor,	Amherst,	31 East Pleasant Street.
Phipps, Clarence Ritchie,	Dorchester,	88 Pleasant Street.
Popp, Edward Williams,[1]	Albany, N. Y.,	9 North College.
Powell, James Congdon,	Newport, R. I.,	6 South College.
Pratt, Oliver Goodell,	Salem,	Kappa Sigma.
Preble, John Nelson,	Jamaica Plain,	Theta Chi.
Raymond, Clinton Rufus,	Beverly,	82 Pleasant Street.
Reumann, Theodore Henry,	New Bedford,	87 Pleasant Street.
Richardson, Stephen Morse,	Montague,	6 South College.
Ritter, Ernest,	New Britain, Conn.,	88 Pleasant Street.
Roberts, Oliver Cousens,[1]	Arlington,	88 Pleasant Street.

[1] Work incomplete.

Robinson, William Herbert, [1]	Hudson,	87 Pleasant Street.
Rosequist, Birger Reignold, [1]	New Bedford,	85 Pleasant Street.
Russell, Howard Leigh,	Worcester,	116 Pleasant Street.
Rutter, Walter Frederick, [1]	Lawrence,	17 Fearing Street.
St. George, Raymond Alexander, [1]	East Lynn,	Commons Club.
Sampson, Frederick Bucknam, [1]	Fall River,	60 Pleasant Street.
Sanborn, Deane Waldron,	Nantucket,	Birch Lawn.
Sawyer, Wesley Stevens,	Jamaica Plain,	Beta Kappa Phi.
Sawyer, William George,	Berlin,	8 South College.
Schlough, George Homer, [1]	Waltham,	82 Pleasant Street.
Schwartz, Louis, [1]	Melrose,	West Experiment Station.
Smith, Carleton Tower,	West Newton,	82 Pleasant Street.
Smith, Sidney Summer,	Roslindale,	3 Fearing Street.
Spaulding, Lewis Winans, [1]	Boston,	5 South College.
Stackpole, Frank Charles, [1]	Somerville,	15 North College.
Stjernlof, Axel Uno,	Worcester,	Farview Way.
Stowe, Raymond Timothy,	Scitico, Conn.,	51 Amity Street.
Stowers, Addison Clifford,	Dorchester,	South College.
Sullivan, Harold Leo,	Lawrence,	9 North College.
Swift, Raymond Walter, [1]	North Amherst,	North Amherst.
Thompson, Wells Nash,	Adams,	Alpha Sigma Phi.
Thorpe, Richard Warren, [1]	West Medford,	Phi Sigma Kappa.
Tilton, Arthur Dana,	Wellesley,	Phi Sigma Kappa.
Van Alstyne, Lewis Morrell, [1]	Kinderhook, N. Y.,	Phi Sigma Kappa.
Weeks, Roger Wolcott, [1]	Hyde Park,	Kappa Sigma.
Wilbur, Laurence Weston, [1]	South Middleborough,	Beta Kappa Phi.
Willoughby, Raymond Royce,	New Britain, Conn.,	24 Beston Street.
Wooding, Paul Bennett, [1]	Yalesville, Conn.,	M. A. C. Plant House.
Woodworth, Brooks, [1]	Lowell,	85 Pleasant Street.
Worthley, Harlan Noyes,	Greenwood,	Kappa Sigma.

Class of 1919.

Alden, Dean Watson, [1]	Proctor, Vt.,	Lambda Chi Alpha.
Bagg, Quincy Austin, [1]	South Hadley,	60 Pleasant Street.
Baker, William Alphonso,	Melrose,	Lambda Chi Alpha.
Baker, William Herbert, Jr.,	Chesterfield,	Theta Chi.
Batchelder, Stewart Putnam,	North Reading,	7 South College.
Batista, Victor, [1]	Havana, Cuba,	90 Pleasant Street.
Baxter, Herbert Hill, [1]	Brighton,	Alpha Sigma Phi.
Beadle, Herbert Ocumpaugh, [1]	Lima, N. Y.,	18 Nutting Avenue.
Bigelow, George Samuel, [1]	Millville, N. J.,	3 McClure Street.
Blanchard, Carlton Douglas, [1]	Uxbridge,	Kappa Sigma.
Blanchard, George Kinson,	Abington,	Kappa Sigma.
Bögholt, Carl Miller, [1]	Newport, R. I.,	27 Pleasant Street.
Boland, Kells Shepard, [1]	South Boston,	120 Pleasant Street.
Bond, Herbert Richard,	Needham,	Lincoln Avenue.
Bowen, Arthur Newton, [1]	Wollaston,	15 Phillips Street.
Bowen, Maurice Stetson, [1]	Middleborough,	81 Pleasant Street.
Boyce, Alan Freeman,	Melrose,	83 Pleasant Street.
Boynton, Raymond Woods, [1]	Framingham,	85 Pleasant Street.
Bradley, William George, [1]	Groton,	88 Pleasant Street.
Brigham, Sylvia Bowen,	Newtonville,	Draper Hall.
Brown, Ralph Hall, [1]	Ayer,	Kappa Sigma.
Buffum, Eliot Mansfield,	Waban,	10 South College.
Burt, Henry John,	Arlington,	10 Allen Street.
Burton, Lee Williams,	Plainville,	35 East Pleasant Street.
Callanan, John Edward, [1]	Dorchester,	60 Pleasant Street.
Callanan, Vincent DePaul,	Malden,	4 Chestnut Street.
Carpenter, Hall Bryant, [1]	Somerville,	Kappa Sigma.
Carroll, Olive Evangeline, [1]	Dorchester,	Draper Hall.

[1] Work incomplete.

Cassidy, Morton Harding,[1]	East Boston,	82 Pleasant Street.
Castle, George Burdette,[1]	Pittsfield,	77 Pleasant Street.
Chandler, Arthur Lincoln,	Leominster,	3 Nutting Avenue.
Chapin, Frederic Charles,	Greenfield	West Experiment Station.
Chase, Malcolm Willis,[1]	Amesbury,	94 Pleasant Street.
Chisholm, Robert Dudley,	Melrose Highlands,	66 Pleasant Street.
Clapp, Agustus Warren,	East Braintree,	Lambda Chi Alpha.
Coderre, Ernest Laurier,	Southbridge,	35 North Prospect Street.
Collins, Robert Burleigh,	Rockland,	88 Pleasant Street.
Cone, Willis Refine,[1]	Mittineague,	42 McClellan Street.
Cooley, Edwin Prince,	Sunderland,	Sunderland.
Cosby, Alfred Francis,	Westfield,	15 Amity Street.
Crane, Arthur Francis,[1]	North Hanover,	24 Beston Street.
Crimmin, Royce Brainerd,[1]	Bradford,	82 Pleasant Street.
Crowe, Charles,	Norwich, Conn.,	Kappa Sigma.
Davies, James Pillsbury,	Cambridge,	6 Phillips Street.
Day, Harold Ralph,	Milford,	North College.
Dickinson, Victor Abel,[1]	Amherst,	Mount Pleasant.
Dunbar, Charles Oliver,	Westfield,	84 Pleasant Street.
Erhard, Bena Gertrude,	East Milton,	Draper Hall.
Erickson, Gunnar Emmanuel,	West Lynn,	29 McClellan Street.
Evans, Myrton Files,	West Somerville,	Kappa Sigma.
Faber, Edward Stuart,	Plainfield, N. J.,	M. A. C. Store.
Faneuf, Ambrose Clement,[1]	West Warren,	Birch Lawn.
Farrington, Robert Pierce,[1]	Nantucket,	15 Beston Street.
Faxon, Paul,[1]	Wellesley Hills,	66 Pleasant Street.
Fellows, Katharine Adelheid,	Northampton,	21 Amity Street.
Ferriss, Samuel Boynton,	New Milford, Conn.,	Beta Kappa Phi.
Field, Wilbert Daniel,[1]	Winter Hill,	29 McClellan Street.
Fiske, Eustace Bridge,	Somerville,	6 Nutting Avenue.
Fogg, Verne Allen,	Topsfield,	4 Chestnut Street.
Fox, Charles,	Baltimore, Md.,	17 Kellogg Avenue.
French, Willard Kyte,	Worcester,	6 Phillips Street.
Garde, Earl Augustus,	Lynn,	30 North Prospect Street.
Garvey, Mary Ellen Monica,	Amherst,	27 South Prospect Street.
Gilligan, Gerald Mathew,[1]	West Warren,	120 Pleasant Street.
Glavin, William Francis,	Wenham,	North College.
Goff, Howard Mason,	Cambridge,	120 Pleasant Street.
Graves, Walter Decker,[1]	Brookline,	1 North College.
Green, Lynn,	Schenevus, N. Y.,	6 Nutting Avenue.
Guba, Emil Frederick,	New Bedford,	6 Nutting Avenue.
Hall, Frank Edwin,[1]	Revere,	103 Pleasant Street.
Hamilton, Howard Milton,[1]	Winchester,	Cottage Street.
Harding, George Warren,[1]	Somerville,	Flint Laboratory.
Harris, Ethel Lovett,[1]	Beverly,	Draper Hall.
Hartwell, Richard Raymond,[1]	Springfield,	Colonial Inn.
Harvey, Ebenezer Erskine,[1]	Washington, D. C.,	Physics Building.
Hastings, Louis Pease,	Springfield,	Kappa Sigma.
Hathaway, Wilfred Adelbert,[1]	Taunton,	88 Pleasant Street.
Hodgson, Benjamin Earl,	Methuen,	22 Amity Street.
Hopkins, George Randolph Lawrence.	Orleans,	60 Pleasant Street.
Howe, Ralph Thomas,	Melrose Highlands,	120 Pleasant Street.
Hunter, Harold Clayton,[1]	South Hadley Falls,	60 Pleasant Street.
Jewell, Charles Henry,	Merrimac,	17 Kellogg Avenue.
Johnson, Lawrence Wilhelm,	Avon,	12 Cottage Street.
Johnson, Sidney Clarence,	Gloucester,	Beta Kappa Phi.
Jordan, Raymond Douglas,[1]	Springfield,	21 Fearing Street.
Kennedy, Alan Giles,[1]	Milford,	85 Pleasant Street.
Kimball, William Lincoln,[1]	Orange,	35 East Pleasant Street.
King, William Cutting,[1]	Suffield, Conn.,	120 Pleasant Street.

[1] Work incomplete.

Knight, Frank Edward, [1]	Brimfield,	35 East Pleasant Street.
Knowlton, Priscilla, [1]	Roxbury,	M. A. C. Farm House.
Leary, Frank Dennis,	Brockton,	12 Cottage Street.
Leiper, McCarrell Hudson,	Blauvelt, N. Y.,	Lincoln Avenue.
Liebman, Anna,	Dorchester,	Draper Hall.
Logan, Milan Alexander,	Brockton,	Lincoln Avenue.
Mansell, Elton Jessup, [1]	Cambridge,	4 Chestnut Street.
Martin, Andrew Laurence, [1]	Hopedale,	Colonial Inn.
Mather, William,	Amherst,	Fitts House.
Mattoon, Charles Gordon,	Pittsfield,	120 Pleasant Street.
McCarthy, Arthur Martin,	Monson,	9 South College.
McClellan, Adams Newton,	Keene, N. H.,	Kappa Sigma.
Montgomery, Forest Kimball, [1]	East Orange, N. J.,	87 Pleasant Street.
Moor, Erwin Charles, [1]	Lynn,	10 Allen Street.
Moore, John Raymond,	Tolland,	Birch Lawn.
Morgan, Earl Amos, [1]	Amherst,	2 Allen Street.
Morse, Maurice,	Dorchester,	Entomology Building.
Morton, Elmer Joshua, [1]	Watertown,	Commons Club.
Newbold, Douglas Tracy,	Northampton,	87 Pleasant Street.
Newton, Adelbert, [1]	Lenox,	77 Pleasant Street.
Newton, Edward Buckland, [1]	Boston,	Chemistry Laboratory.
O'Hara, Joseph Ernest,	Worcester,	6 Phillips Street.
Parke, Robert Warren,	Winchendon,	5 Allen Street.
Parkhurst, Raymond Thurston,	Fitchburg,	Kappa Sigma.
Parsons, Edward Field,	North Amherst,	North Amherst.
Peck, George Newberry,	North Granby, Conn.,	10 Allen Street.
Peck, Roger Eugene, [1]	Shelburne,	6 Nutting Avenue.
Peirson, Henry Byron,	Bradford,	18 Nutting Avenue.
Perry, Errol Clinton, [1]	Acushnet,	15 Hallock Street.
Peterson, Leroy Duane, [1]	Brooklyn, N. Y.,	120 Pleasant Street.
Pierpont, Frederick Trowbridge,	Chester, Pa.,	18 Nutting Avenue.
Pond, Allan Leon,	Holliston,	Kappa Sigma.
Poole, Harold Walter, [1]	Hudson,	Beta Kappa Phi.
Prée, Karl Julius,	Brookline,	88 Pleasant Street.
Pulley, Marion Gertrude, [1]	Melrose,	2 Allen Street.
Quimby, Arthur Edmund,	Boston,	36 North Prospect Street.
Ratner, Charles Cosrael,	Springfield,	3 Pleasant Street.
Rea, Julian Stuart,	East Weymouth,	Lincoln Avenue.
Readio, Roger Frank,	Florence,	90 Pleasant Street.
Record, Harold Jordan, [1]	West Boylston,	Butterfield Avenue.
Rice, Harold Miller,	Cheshire,	Stockbridge Hall.
Robbins, Waldo Whiting,	South Hingham,	14 Nutting Avenue.
Roberts, Mark Anthony,	Dorchester,	25 Lincoln Avenue.
Ross, Donald, [1]	Boston,	Phi Sigma Kappa.
Rowe, Clifford Alton, [1]	East Orange, N. J.,	Phi Sigma Kappa.
Sargent, Walter Harriman, [1]	Malden,	Draper Hall.
Schenkelberger, Frederic, [1]	Quincy,	10 South College.
Seavey, Paul Stanley, [1]	Cambridge,	Commons Club.
Sedgwick, Alfred,	Fall River,	85 Pleasant Street.
Sexton, Ernest Francis, [1]	Darien, Conn.,	3 Nutting Avenue.
Sheldon, Howard Rhoades,	Mill River,	4 Chestnut Street.
Sibley, Helen Aramintha,	Longmeadow,	Draper Hall.
Skinner, Everett Hamilton, [1]	West Upton,	Kappa Sigma.
Smith, Jonathan Harold,	Roslindale,	88 Pleasant Street.
Smith, Wendell Frederick,	Troy, N. Y.,	10 Allen Street.
Spaulding, Harold Edwin,	Milford,	Kappa Sigma.
Spencer, Arthur Winthrop, [1]	Danvers,	North College.
Stafford, Irving Boynton,	Fall River,	6 Nutting Avenue.
Stearns, Horace David,	Waltham,	18 Nutting Avenue.
Stevens, Chester Dillingham,	Reading,	10 Allen Street.
Stockwell, Erwin Sidney, Jr.,	Sharon,	Commons Club.

[1] Work incomplete.

Strack, Edward,	Framingham,	Clark Hall.
Sutherland, Ralph,	Cambridge,	85 Pleasant Street.
Sweeney, William Joseph,[1]	Dorchester,	35 North Prospect Street.
Taylor, Edmund Billings,	Wollaston,	17 Fearing Street.
Thayer, Julian Bailey,	Durham Center, Conn.,	36 North Prospect Street.
Thayer, Weston Cushing,[1]	Hingham,	53 Lincoln Avenue.
Thomas, Frank DesAutel,[1]	Milford,	Lincoln Avenue.
Tietz, Harrison,	Richmond Hill, N. Y.,	24 Beston Street.
Tirrell, Loring Vinson,[1]	South Weymouth,	Lincoln Avenue.
Underwood, Arthur Leslie,	Maynard,	Beta Kappa Phi.
Vickers, John,	Amherst,	Beta Kappa Phi.
Waite, Richard Austin,	Middlefield,	90 Pleasant Street.
Wells, Marion Nichols,	Springfield,	Draper Hall.
Wheeler, Russell Hubbell,[1]	Hawleyville, Conn.,	4 Chestnut Street.
White, Edward Asa,	Providence, R. I.,	4 Chestnut Street.
Whittle, Clarence Parker, Jr.,[1]	Weymouth,	Phi Sigma Kappa.
Williams, Allan Carruth,	Rockland,	Commons Club.
Williams, Kenneth Sanderson,[1]	Sunderland,	9 South College.
Window, James Joseph,	Amherst,	7 Allen Street.
Wing, Arland Junius,	Hathorne,	North College.
Wood, Oliver Wiswell,	Arlington,	81 Pleasant Street.
Woodard, Chester Smith,[1]	Leverett,	Leverett.
Woodbury, Ray Willard,[1]	Newburyport,	Cottage Street.
Woodside, Wilfred Livingstone,	Boston,	4 Chestnut Street.
Yesair, John,[1]	Byfield,	Kappa Sigma.

CLASS OF 1920.

Allen, Harold Kenneth,	Belchertown,	Belchertown.
Anderson, George,	Somerville,	1 South College.
Anderson, Gust William,[1]	Brockton,	Lincoln Avenue.
Andrews, George Henry,	Farmington, Conn.,	1 School Street.
Apsey, George Wills, Jr.,[1]	Winchester,	17 Phillips Street
Armstrong, John Shepard,[1]	East Sandwich,	35 East Pleasant Street.
Armstrong, Philip Brownell,[1]	Rutherford, N. J.,	Farview Way.
Babcock, Leslie Edmund,[1]	Marlborough,	36 North Prospect Street.
Bacon, Milo Roderick,	Leominster,	87 Pleasant Street.
Bailey, William,	Williamstown,	25 Pleasant Street.
Ball, Harry Abraham,	Bridgewater,	5 Sunset Avenue.
Ball, Lorin Earl,	Amherst,	3 Allen Street.
Beauregard, Winfield Scott,	Framingham,	53 Lincoln Avenue.
Berman, Harry,	Holyoke,	Birch Lawn.
Berman, Louis,[1]	Dorchester,	41 Pleasant Street.
Bigelow, Henry Charles,	Millville, N. J.,	3 McClure Street.
Blake, Robert Austin,[1]	Wollaston,	Pleasant Street.
Blanchard, Kenneth,[1]	Haverhill,	8 Nutting Avenue.
Boardman, Charles Meade,	Amherst,	33 Lincoln Avenue.
Bowen, Abram Temple,[1]	Granville, N. Y.,	7 Allen Street.
Bowmar, Ralph Burton,	Canton,	29 North Prospect Street.
Bridge, James Pitts,[1]	San Antonio, Tex.,	120 Pleasant Street.
Brown, Roy Robertson,	Wollaston,	Sunny Villa.
Bunker, Carroll Wooster,	West Somerville,	4 Nutting Avenue.
Burnett, Paul Lapham,	Leicester,	5 Nutting Avenue.
Burns, Allan Melville,	Taunton,	83 Pleasant Street.
Cande, Robert Parsons,	Pittsfield,	5 Fearing Street.
Card, Ralph Hunter,	Somerville,	3 Nutting Avenue.
Carleton, John Foxcroft,	East Sandwich,	35 East Pleasant Street.
Center, Arthur Edwin,[1]	Springfield,	73 Pleasant Street.
Chase, Francis Chapin,	Royalston,	35 East Pleasant Street.
Clarridge, Fred William,	Milford,	Lincoln Avenue.
Clough, Alfred Arnold,	Wollaston,	Sunny Villa.
Cole, Frederick Eugene, Jr.,	South Portland, Me.,	29 McClellan Street.

[1] Work incomplete.

Crafts, Gordon Burnham,	Manchester,	25 Pleasant Street.
Crawford, Alexander George,[1]	Waverley,	10 Nutting Avenue.
Crawford, John Alexander,	Allston,	10 Allen Street.
Daggett, Clinton Jones,	New York, N. Y.,	23 Lincoln Avenue.
Davenport, Frank Semore,[1]	Dorchester,	Lincoln Avenue.
Davidson, Donald Gordon,	Amherst,	7 Northampton Road.
Davis, Orrin Chester,	Belchertown,	Belchertown.
Delahunt, John Kersey,[1]	Boston,	10 Nutting Avenue.
Derick, Glendon Robert,	Clinton,	36 North Prospect Street.
Dewing, Warren Montague,	Kingston,	31 East Pleasant Street.
Dixon, Harry Louis,	Harrisville, R. I.,	66 Pleasant Street.
Doucette, Charles Felix,	Melrose,	Hillside Avenue.
Douglass, Donald Churchill,	Arlington,	3 Nutting Avenue.
Dwyer, James Edward,	Sunderland,	Alpha Sigma Phi.
Earley, Marion Edith,[1]	West Newton,	9 Phillips Street.
Eldredge, Reuel West,	Winchester,	Pease Avenue.
Emery, Herbert Martin,[1]	Newburyport,	Cottage Street.
Farnsworth, Richard Wasgatt,	Lancaster,	7 East Pleasant Street.
Fuller, Lorenzo,	Lowell,	7 Nutting Avenue.
Gaskill, Harland Everett,[1]	Hopedale,	North Pleasant Street.
Gay, Laurence Washburn,	Groton,	88 Pleasant Street.
Golosov, James Sidney,	Dorchester,	67 Pleasant Street.
Gorwaiz, Richard Hamblet,	Newburyport,	66 Pleasant Street.
Graff, Leland Sprague,[1]	Reading,	10 Allen Street.
Graves, Carlisle Ferrin,	Stamford, Conn.,	7 Allen Street.
Gray, Irving Emery,	Woods Hole,	13 Phillips Street.
Gustafson, William Nathaniel,[1]	Worcester,	5 Nutting Avenue.
Hale, Frank Thompson Caldwell,	Byfield,	66 Pleasant Street.
Hamlin, Hazen Wolcott,[1]	Amherst,	35 East Pleasant Street.
Harrington, Harold Leon,	Lunenburg,	44 Triangle Street.
Haskins, Harold Arthur,	North Amherst,	North Amherst.
Hathaway, Richmond Hobson,	Warren,	35 East Pleasant Street.
Hathaway, Warren Sidney,[1]	Somerset,	75 Pleasant Street.
Haynes, Charles Francis,[1]	Canton,	36 North Prospect Street.
Hemenway, Carl Marshall,[1]	Williamsburg,	73 Pleasant Street.
Hersom, Allen Humphrey,[1]	Acushnet,	46 Pleasant Street.
Higgs, John Alden,	Wareham,	120 Pleasant Street.
Hill, John Farren,[1]	Scituate,	Pease Avenue.
Hill, Theodore, Jr.,	Jefferson Valley, N. Y.,	44 Triangle Street.
Hillabold, Charles Kroh,	Syracuse, Ind.,	Mount Pleasant.
Holland, Frank Harold,[1]	Shrewsbury,	73 Pleasant Street.
Holloway, John William,	Taunton,	81 Pleasant Street.
Horne, Robert Sanderson,	Wellesley Farms,	77 Pleasant Street.
Howland, George Herbert,[1]	Melrose,	120 Pleasant Street.
Hurd, Davis Alden,	Wellesley Hills,	36 North Prospect Street.
Hurd, Gordon Killam,	Millbury,	36 North Prospect Street.
Hyde, Kenneth Squier,	Amherst,	51 Pleasant Street.
Iorio, Carlo Antonio,	Springfield,	75 Pleasant Street.
Jakeman, Brooks Franklin,[1]	Winchester,	116 Pleasant Street.
Johnson, Alberta,	Old Westbury, L. I.,	M. A. C. Farm House.
Johnson, Conrad John,	Campello,	15 Hallock Street.
Jones, Edson Temple,[1]	Roslindale,	42 McClellan Street.
Jones, Robert Lambert,	North Easton,	5 McClellan Street.
Keene, Walter William,	Roslindale,	12 Cottage Street.
King, Starr Margetts,	Pittsfield,	5 Fearing Street.
Lambert, Richard Bowles,[1]	Stow,	21 Amity Street.
Lent, Donald Ashford,	Maynard,	35 East Pleasant Street.
Levine, Maurice Eleazer,	Sherborn,	Lincoln Block.
Liang, Ping,	Canton, China,	21 Fearing Street.
Lindquist, Harry Gotfred,	Holden,	15 Hallock Street.
Littlefield, John Edwin,	Lynn,	15 Hallock Street.
Lothrop, Earle Daniel,	West Bridgewater,	77 Pleasant Street.

[1] Work incomplete.

Luce, William Alan,	West Boylston,	4 Chestnut Street.
Lyons, Henry Egmont,	Norwell,	29 North Prospect Street.
MacArdle, Herbert Aloysius,[1]	Worcester,	Colonial Inn.
MacLeod, Guy Franklin,	Lowell,	Lincoln Avenue.
Mallon, Charles Hugh,	East Braintree,	75 Pleasant Street.
Mangum, Andrew Bruyette,[1]	Holyoke,	60 Pleasant Street.
Maples, James Comly,	Port Chester, N. Y.,	81 Pleasant Street.
Martin, Laurence Paul,	Malden,	6 Phillips Street.
McDonald, Milton Crandall,	Peabody,	120 Pleasant Street.
McGeorge, William Brimble,	Greenwich, Conn.,	3 McClellan Street.
McNulty, Raymond Henry,	Amherst,	6 South East Street.
Meserve, Albert Wadsworth,[1]	Framingham,	53 Lincoln Avenue.
Millard, Helen Stanley,	Great Barrington,	M. A. C. Farm House.
Munroe, Raymond Franklin,	Fall River,	Commons Club.
Murray, Harry Athol, Jr.,[1]	Raynham Centre,	81 Pleasant Street.
Mutty, Allan Victor,[1]	Boston,	4 Chestnut Street.
Newell, Philip Sanger,	West Newton,	35 East Pleasant Street.
Oppe, Herman DeWitt,	Newtown, Conn.,	94 Pleasant Street.
Ortloff, Henry Stuart,[1]	Newton,	Clark Hall.
Paige, Joseph Cutler,[1]	Hardwick,	7½ East Pleasant Street.
Parkin, William Hildreth,	West Springfield,	Tillson Court.
Peckham, William Harold,[1]	Newport, R. I.,	81 Pleasant Street.
Phillips, Stephen Austin,[1]	Pittsfield,	75 Pleasant Street.
Plowman, George Taylor, Jr.,	Winthrop,	13 Phillips Street.
Porteck, Henry George,[1]	Lowell,	Lincoln Avenue.
Putnam, Frederic Henry,[1]	Framingham,	73 Pleasant Street.
Quadland, Howard Preston,[1]	North Adams,	81 Pleasant Street.
Quincy, Percy Edmund,[1]	Allston,	7 Nutting Avenue.
Readio, Philip Adna,	Florence,	120 Pleasant Street.
Redding, George Kenneth,	Melrose,	29 Pleasant Street.
Reed, Morris,[1]	Worcester,	73 Pleasant Street.
Richards, George Henry,	Springfield,	15 Phillips Street.
Richardson, Mark Morton,	North Dana,	8 Nutting Avenue.
Roberts, Ivan Andrew,[1]	South Lee,	3 McClellan Street.
Robertson, Lafayette Janes, Jr.,[1]	Hartford, Conn.,	29 Pleasant Street.
Robertson, William Fenton,[1]	Framingham,	53 Lincoln Avenue.
Sanborn, Joseph Raymond,[1]	North Amherst,	North Amherst.
Sanderson, Ralph Hemmenway,	Waltham,	42 McClellan Street.
Schandelmayer, Ralph Ernest,[1]	Marlborough,	Stockbridge Hall.
Scott, Clifton William,[1]	Buckland,	14 Nutting Avenue.
Shaughnessy, Howard John,	Easthampton,	17 Phillips Street.
Silverman, Joseph,[1]	Dorchester,	5 Nutting Avenue.
Simmons, Lester Winslow,	Dighton,	75 Pleasant Street.
Smith, Donald Hiram,[1]	Pittsfield,	77 Pleasant Street.
Smith, Fred George,	Otter River.	72 Main Street.
Smith, George Alfred,	Whitinsville,	Lincoln Avenue.
Smith, Herbert Thatcher,	Atlantic,	Sunny Villa.
Smith, Raymond Archer,[1]	Maynard,	35 East Pleasant Street.
Smith, Raymond Newton,[1]	Plainville,	35 East Pleasant Street.
Smith, Susan Almira,	Great Barrington,	M. A. C. Farm House.
Snow, John Dow,[1]	Arlington,	77 Pleasant Street.
Spencer, William,	Worcester,	McClure Street.
Steacie, Curtis,	Framingham,	17 Phillips Street.
Stedman, Ralph Shaw,[1]	Springfield,	15 Phillips Street.
Stiles, William Burling,	Great Barrington,	4 Chestnut Street.
Strecker, Edmund Herman,	New York, N. Y.,	3 McClellan Street.
Sullivan, Walter Mitchell,[1]	Lawrence,	Lincoln Avenue.
Sumner, Ralph Martin,	Springfield,	35 East Pleasant Street.
Sweeney, Frank Joseph,	Whitman,	12 Cottage Street.
Talmage, Harry John,	Alford,	21 Amity Street.
Taylor, Elliot Hubbard,	Shelburne,	North Amherst.
Taylor, Thornton Greenwood,	Brookline,	103 Butterfield Avenue.

[1] Work incomplete.

Torrey, Converse Hall,[1]	Williamstown,	25 Pleasant Street.
Turner, Alfred William,[1]	Santo Domingo,	53 Lincoln Avenue.
Urquhart, John Wardrop,	East Walpole,	Hallock Street.
Vigezzi, John Dellea,	Great Barrington,	75 Pleasant Street.
Vigezzi, Mary Theresa,	Great Barrington,	M. A. C. Farm House.
Ware, Mason,[1]	Malden,	6 Phillips Street.
Waugh, Frederick Vail,	Amherst,	Amherst.
Webster, Milton Fuller,[1]	Malden,	73 Pleasant Street.
Willis, Maud Ethel,[1]	Amherst,	13 Cottage Street.
Woodward, Ralph, Jr.,[1]	Grafton,	7 Nutting Avenue.
Wright, Kenneth Yerxa,[1]	Arlington,	77 Pleasant Street.
Wright, Stuart Eldridge,	Taunton,	53 Lincoln Avenue.

Unclassified Students.

Allen, Arthur Frederic,	Boston,	The Perry.
Avery, Humphrey Roger,	Patchogue, N. Y.,	86 Pleasant Street.
Berry, Fred Mitchell,[1]	Lynnfield Center,	120 Pleasant Street.
Blanchard, Margery Elizabeth,	Linwood,	79 Pleasant Street.
Bridgman, Ralph Scofield,	Westhampton,	60 Pleasant Street.
Buck, Paul Ten Hagen,	La Grangeville, N. Y.,	6 Allen Street.
Campbell, John Collins,	Gardner,	35 North Prospect Street.
Clancy, Henry Gregory,[1]	Natick,	35 North Prospect Street.
Cross, Robert Earle,	Agawam,	21 Fearing Street.
Curran, Ralph Aloysius,	East Boston,	5 Allen Street.
Davis, Edwin John,	Holyoke,	35 East Pleasant Street.
Emerson, Caroline Dwight,	Amherst,	21 Northampton Road.
Floersh, Mary Frances,	Nashville, Tenn.,	Draper Hall.
Giles, John Farrar,	South Lincoln,	1 Cottage Street.
Grundler, Adolph Joseph,	Lowell,	Poultry Plant.
Harris, Warren Timothy,	Millbury,	60 Pleasant Street.
LaPoint, Wilfred John,	Greenfield,	6 Allen Street.
Messmer, Robert Frederick,	Milwaukee, Wis.,	10 Allen Street.
Morton, Leander Paul,	Amherst,	Lincoln Avenue.
Norris, Harold Allison,[1]	Amherst,	Birch Lawn.
Novitski, Joseph Francis,	Amherst,	Amherst.
Palmer, Philip Leonard,	Springfield,	Lincoln Avenue.
Rollins, Eva Isolde,	Amherst,	21 Main Street.
Rucker, Harriett Evans,	Amherst,	5 School Street.
Scott, John Edmund,	Fort Wayne, Ind.,	6 Allen Street.
Searls, Edward Marlborough,	Schaghticoke, N. Y.,	North Amherst.
Watson, Hawkesworth Douglas,	Walpole,	5 Allen Street.
Whitman, Luther Oakes,	Amherst,	29 Pleasant Street.
Woods, Frank Archibald,	Groton,	83 Pleasant Street.

Vocational Poultry Students.

Alden, Margaret E.,	Abington,	17 Kellogg Avenue.
Anderson, Ernest Emil,	Medford,	7 Nutting Avenue.
Andrews, Nelson Irving,	Hyde Park,	35 East Pleasant Street.
Churchill, Oliver Claude,	West Somerville,	44 Triangle Street.
Coleman, Moses Milton,	Mendon,	Farview Way.
Fitzgerald, Albert Joseph,	Braintree,	Poultry Plant.
Hallock, Genevieve,	Westborough,	4 Chestnut Street.
Savage, John Batcheller,	Cambridge,	12 Nutting Avenue.

[1] Work incomplete.

Geographical Summary.

Massachusetts,	567
Connecticut,	27
New York,	25
New Jersey,	16
Indiana,	7
Pennsylvania,	5
Rhode Island,	5
New Hampshire,	4
Vermont,	4
Maine,	3
Michigan,	3
Tennessee,	3
Missouri,	2
Canada,	2
Wisconsin,	2
California,	1
District of Columbia,	1
Kansas,	1
Maryland,	1
Mississippi,	1
Montana,	1
Ohio,	1
South Carolina,	1
Texas,	1
Virginia,	1
China,	1
Cuba,	1
France,	1
India,	1
Santo Domingo,	1
Total,	690

Summary by Classes.

Graduate students,	67
Senior class, 1917,	104
Junior class, 1918,	138
Sophomore class, 1919,	174
Freshman class, 1920,	170
Unclassified students,	29
Vocational poultry students,	8
Total registration,	690

Short Course Students, 1916.

The Ten Weeks' Course.

Ahrens, George,	Springfield.
Allen, Wm. R.,	Maylan, Pa.
Alvarez, Frederic G.,	Springfield.
Anderson, Ernest,	Amherst.
Archambo, David P.,	Griswoldville.
Bailey, Roland S.,	Kingston.
Beaman, Lawrence H.,	Leverett.
Bent, Whitney J.,	Maynard.
Bertolf, August C.,	Greenwich.
Bisbee, P. E.,	Amherst.
Blackmer, John W.,	Orange.
Blackwelle, Malcolm G.,	Fairhaven.
Blake, Robert A.,	Wollaston.
Brady, James,	Petersham.
Brooks, Roger E.,	Worcester.
Bryan, Lester W.,	Worcester.
Buckley, John,	Newburyport.
Burt, Gordon E.,	Plainfield.
Carley, Mrs. H. S.,	Amherst.
Chadwick, John T., Jr.,	West Boxford.
Challet, Fred E.,	Northampton.
Chamberlain, Harlan E.,	Abington.
Cheney, Waldo E.,	Dedham.
Childs, Alexander G., Jr.,	Dorchester.
Clapp, Robert,	Northampton.
Cole, E. Francis,	Dedham.
Cole, Emma M.,	Dedham.
Corbin, Erford H.,	Palmer.
Coristine, Mrs. Mary S.,	Amherst.
Coristine, Walter H.,	Amherst.
Cox, Ralph E.,	Wakefield.
Crocker, John A.,	Newton.
Cromack, Leslie G.,	Bardwell's Ferry.
Cudworth, Robert P.,	Melrose Highlands.
Dana, Carlos E.,	Oxford.
Daniels, George H.,	Newton.
Davidson, Harold J.,	Auburn.
Delvey, Ernest,	Turners Falls.
Doran, Albert J.,	Lynn.
Dorling, Herbert,	Spencer.
Downey, Clifton W.,	Maynard.
Dragon, Raymond,	Northampton.
Dunn, Ralph C.,	Mattapoisett.
Durant, Herbert R.,	Leverett.
Durfee, Volney L.,	Bristol.
Emerson, Carl E.,	Waltham.
Erickson, Harry,	Westford.
Erikson, Paul F.,	Rockland.
Estes, Lawrence H.,	Windsor.
Ewing, Stanley M.,	Easthampton.
Farrell, Thomas E.,	Pittsfield.

Fay, Allen M.,	Watertown.
Ferris, Adaline L.,	Ridgefield Park, N. J.
Fiske, Wm.,	Northampton.
Frye, Howard S.,	Lunenburg.
Fuller, Sears,	Roxbury.
Gale, George T.,	Springfield.
Galusha, G. Newell,	Williamstown.
Gillette, Kent,	Collinsville.
Grant, Gladys M.,	Brockton.
Groff, Paul W.,	Amherst.
Hammond, Burton H.,	Onset.
Hanrahan, John B.,	Lawrence.
Hansburg, Philip, Jr., 2d,	Hartford, Conn.
Hardy, Fred C.,	Lancaster.
Harrington, Carl R.,	Lunenburg.
Harris, W. T.,	Millbury.
Heine, Mrs. Helen M.,	State Line.
Higgins, Robert H.,	Arlington.
Hildreth, Leon F.,	Westford.
Hold, Mrs. Mabel B.,	Princeton, Me.
Hold, Ralph E.,	Oxford.
Holmes, Orlando D.,	North Billerica.
Hook, Homer M.,	Reading.
Howard, Wm.,	Northampton.
Hoxie, Asa S.,	Mattapoisett.
Hurlbutt, Horace C., Jr.,	Westport.
Jauncey, Wm.,	Groton.
Johnson, Robert B.,	Westborough.
Johnson, Roy L.,	Geneva, Ohio.
Keith, Willard F.,	Worcester.
Kellogg, Daniel F.,	Sheffield.
Kendall, Waldo W.,	Hadley.
Kenner, Edward M.,	Springfield.
Ladd, Charles M.,	Springfield.
Lataner, Harry,	Columbia, Conn.
Latham, John C.,	Boston.
Leary, Edward,	LaReville.
Lefevre, Oscar H.,	Jamaica Plain.
Le Geyt, Judson H.,	Barkhamsted, Conn.
Lerner, Philip A.,	Peru.
Lifter, Eli W.,	Hamilton.
Lindsley, Horace N.,	Orange, N. J.
Locke, John W.,	Salem.
Lord, John H.,	Maynard.
Lowney, Daniel W.,	Maynard.
MacDaniel, L. O.,	Ashfield.
MacDonald, Harold R.,	Amherst.
Martin, Orville D.,	Lunenburg.
Maxwell, Helen,	Brookline.
McCallum, John,	Northampton.
McIntyre, Clark,	Springfield.
McLaughlin, Edward,	Hingham.
McLearn, Robert,	Holliston.
McManus, Mark A.,	Lawrence.
Melrose, Fred,	Brookfield.
Mentor, Ramon B.,	Amherst.
Miller, Donald H.,	East Bridgewater.
Miller, Hugh,	Leeds.
Mitchell, David,	Springfield.
Morse, Clifford,	Northampton.
Murray, Harold,	Amherst.
Norris, Mrs. Elizabeth E.,	Amherst.
O'Leary, Francis,	Holliston.
Perry, Gardner, Jr.,	Dedham.

Priest, Donald L.,	Gleasondale.
Prouty, Ellis F.,	Amherst.
Roech, Alfred,	Southborough.
Richardson, B. K.,	Middleton.
Richardson, Leroy M.,	Winchester.
Rowley, C. A.,	Paxton.
Russell, Helen W.,	Washington, Conn.
Rust, Phillip,	Northampton.
Samaniego, Luis,	Boston.
Savage, Arthur A.,	Philadelphia, Pa.
Scales, Mrs. Richmond P.,	Still River.
Scott, Lyndon,	Whately.
Seemann, Frieda,	Boston.
Shaw, Leslie,	Northampton.
Sheridan, Kathleen,	Winchester.
Smith, Martin M.,	White Valley.
Trowbridge, Virginia H.,	New Haven, Conn.
Tufts, Ellen,	Rockport.
Turner, Willis G.,	North Reading.
Vaughan, Carl,	Shrewsbury.
Ward, Harold,	Amherst.
Warfield, Howard L.,	Buckland.
Warren, Albert P.,	Groton.
Waterman, Fred T.,	Scituate.
Wesson, R. W.,	Grafton.
Wheeler, Sol,	Bantam, Conn.
Whitcomb, Howard R.,	Lunenburg.
Whitcomb, R. Oswald,	West Boylston.
Wilbur, W. A.,	Pittsfield.
Winter, Oliver A.,	West Roxbury.
Wright, Edna,	Springfield.
Wright, John B.,	Oxford.
Wright, Winthrop A.,	Billerica.

Summer School of Agriculture and Country Life.

Abbott, W. J.,	Danvers.
Adams, Ida M.,	Revere.
Agard, Mary C.,	South Hadley.
Allen, Mrs. Lois J.,	Amherst.
Andrew, Pauline M.,	North Adams.
Andrews, Gracy C.,	Amherst.
Archibald, Florence,	Lowell.
Armstrong, Mary C.,	Brooklyn, N. Y.
Austin, Fannie E.,	Leominster.
Austin, Idah R.,	Boston.
Bacon, Hazel,	Meriden, Conn.
Baker, Miss L. H.,	Newton Lower Falls.
Baker, Mrs. Warren S.,	Fort Landerdale, Fla.
Bartlett, Alice G.,	Worthington.
Bennett, Marion E.,	South Meriden, Conn.
Bird, Anna W.,	Wilmington, Del.
Brennan, E. Dorothy,	Melrose.
Broad, Gertrude F.,	Gloucester.
Butcher, Carolyn M.,	Roxbury.
Butcher, Gertrude,	Boston.
Caldwell, Saidee H.,	Bridgeport, Conn.
Campbell, Bertha M.,	East Windsor.
Capen, Elida M.,	Spencer.
Carlton, Louise E.,	Williamstown.
Carroll, Lillian M.,	Rockville, Conn.
Carver, Katharine,	Meriden, Conn.
Chase, Florence E.,	Sturbridge.
Cold, Bertha,	Yonkers, N. Y.

Comins, Esther M.,	Amherst.
Comins, Lucia,	Amherst.
Comins, Mildred L.,	Amherst.
Conway, Mary H.,	Dorchester.
Cook, Mary E.,	Conway.
Cooper, Caro L.,	Chelsea.
Coristine, W. H.,	Amherst.
Coristine, Mrs. W. H.,	Amherst.
Cotter, W. Francis,	Cambridge.
Crosskill, E. Gladys,	Wrentham.
Cummings, Mary F.,	Boston.
Currie, Mrs. Rose H.,	Cambridge.
Davis, Caroline M.,	Reading.
Derby, Dorothy,	Arlington.
Donovan, Nellie C.,	Turners Falls.
Dudgeon, H. N.,	Boston.
Dyer, Gertrude W.,	Provincetown.
Dykenan, Grace E.,	Chelsea.
Elwell, Hazel M.,	Keene, N. H.
Elwell, Susan W.,	Danvers.
Epstein, Anna,	Amherst.
Eustis, Florence M.,	Wellesley Hills.
Eustis, Helen,	Newton.
Fenstel, Edith S.,	South Hadley Falls.
Field, Florence E.,	Abington.
Fisher, Claribel P.,	Natick.
Fitz, Robert F.,	Beach Bluff.
Fitzgerald, A. J.,	Braintree.
Floersh, Miss M.,	Amherst.
Foster, Elliott O.,	Essex Junction, Vt.
French, Alice M.,	Lowell.
Gavin, Gertrude L.,	Roxbury.
Gavin, Madeline R.,	Roxbury.
Giles, Mrs. Lucy M.,	Westminster.
Gillett, Esther A.,	Tilton, N. H.
Gleason, Gertrude E.,	Newton Highlands.
Gleason, Mrs. Linette D.,	Newton Highlands.
Goessmann, Mary F.,	Amherst.
Goodale, Eula P.,	Fairhaven.
Grant, Editha M.,	Salem.
Grenier, Gladys,	Baltimore, Md.
Greninger, Louise C.,	Bridgeport, Conn.
Hagarty, Anne S.,	Dorchester.
Hammond, Grace de W.,	Haverhill.
Harding, Mrs. F. M.,	East Longmeadow.
Harding, Pearl M.,	East Longmeadow.
Harrington, Mabel A.,	North Adams.
Harris, Edna M.,	Meriden, Conn.
Harrison, Geo.,	New York, N. Y.
Hill, Amelia M.,	Brooklyn, N. Y.
Holman, Hilda,	Woburn, Mass.
Hore, Amy,	New York, N. Y.
Hovenden, Lena F.,	Newtonville.
Howe, Florence,	Leominster.
Hunt, Emma A.,	Framingham.
Ingraham, Ida M.,	Holyoke.
Jencks, Martha A.,	West Somerville.
Johnson, Phyllis M.,	Amherst.
Jones, Helen P.,	Waltham.
Jorgensen, George A.,	Waverley.
Josselyn, Abbie P.,	Allston.
Kalfur, Anna,	Richmond Hill, N. Y.
Keith, Lucy E.,	Gardner.
King, Alice W.,	Taunton.

Kingman, Miriam R.,	Somerville.
Labrovitz, Rose,	Amherst.
Lambert, Marjorie W.,	Milledgeville, Ga.
Lance, Eva E.,	South Meriden.
Lang, Elizabeth,	Woodhaven, N. Y.
Lathrop, Florence B.,	Reading.
Lawrence, Ethel F.,	Ashby.
Leete, Cora B.,	Springfield.
Levin, Ethel H.,	Amherst.
Lewis, Alice,	Meriden, Conn.
Lin, T. Y.,	Amherst.
Litch, John H.,	New London, N. H.
Loomis, Miss C. V.,	Winchester.
Lundin, Enor,	Quincy.
Ly, J. Usang,	West Philadelphia, Pa.
MacDougall, Mrs. A. F.,	Northampton.
Malone, Mary S.,	Wilmington, Del.
Middleton, George B.,	Winthrop.
Miller, Elizabeth,	Brookline.
Miller, Fred.,	Lynn.
Mitchell, Edward A.,	Coppahosie, Va.
Morse, Myrtie E.,	Wellesley.
Nagle, Elizabeth K.,	Brookline.
Nahmer, Miss C. D.,	Springfield.
Neale, W. G.,	Lynn.
Newell, Lena E.,	Bridgeport, Conn.
Newton, Georgianna M.,	Worcester.
Niles, Caleb H.,	East Lynn.
North, Miss L. V.,	Bradford.
Nye, Mary E.,	Hingham.
O'Brien, William S.,	Greenwich, Conn.
Osborne, Ethel B.,	Salem.
Pfaelzer, Howard R.,	Boston.
Pincus, Mrs. J. W.,	New York, N. Y.
Pond, Anna H.,	Milford.
Reed, Henry R.,	Arlington.
Reed, Julia,	Boston.
Reineche, Theo. G. W.,	Amherst.
Rhodes, Sara L.,	Brooklyn, N. Y.
Richardson, Alice S.,	Norwood.
Richardson, Ella L.,	Weston.
Robinson, Nathan H.,	Braintree.
Roche, Julia P.,	Salem.
Rogers, Geo. A.,	Jamaica, N. Y.
Rudd, Daisy P.,	Bennington, Vt.
Ruggli, Clara W.,	Cambridge.
Ryan, Bridget A.,	Sunderland.
Sanford, Mary E.,	Plainfield.
Shaddick, George,	Everett.
Simmons, Eva L.,	Bedford.
Smith, Jeannette,	Woburn.
Spokesfield, Mrs. E. M.,	Islington.
Stone, C. H.,	Brookline.
Stoughton Miss L. M.,	Winchester.
Sweeten, Mrs. Almira,	Baltimore, Md.
Swift, Mary E.,	Easton.
Temple, Myrtle G.,	North Adams.
Terry, Mrs. Julia S.,	Plainfield.
Thompson, A. S.,	Amherst.
Thompson, D. V.,	Lawrenceville, N. J.
Turner, Mrs. Mary,	South Meriden, Conn.
Van Auken, Susie M.,	Brockton.
Walker, Mary A.,	Hatfield.
Waterman, Edith G.,	Lowell.

Watson, Mary R.,	Plymouth.
Waugh, Dorothy,	Amherst.
Waugh, Esther,	Amherst.
Welch, Kate A.,	Worcester.
Welch, Mary J.,	Worcester.
West, Helen K.,	Brockton.
Wheeler, W. E.,	Pleasant Hill, Tenn.
White, Helena,	Amherst.
Whitney, Shirley,	Leominster.
Wilcox, Gertrude,	Mattapan.
Wilkins, Marion,	Newtonville.
Willis, Dora F.,	Ashfield.
Willis, Edith,	Brockton.
Wood, Annie D.,	Webster.
Wright, Alice L.,	New Haven, Conn.
Yost, Emma L.,	Meriden, Conn.

School for Rural Social Service.

Barker, George A.,	New Salem.
Blanchard, Miss S. A.,	Fitchburg.
Cardall, A. J.,	Orange.
Dalton, Mary E.,	Northfield.
Dwight, Clara B.,	South Amherst.
Eastman, Frances M.,	Amherst.
Estabrook, Mary V.,	Lunenburg.
Fletcher, Lizzie E.,	Three Rivers.
Garfield, Miss A. M.,	South Ashburnham.
Gleason, Elizabeth,	Burnside, Conn.
Hastings, Mrs. Mary E.,	Hadley.
Howlett, Cora,	South Amherst.
Hudson, Clara E.,	Plainfield.
Jackson, Ethel F.,	Springfield.
Johnson, Pearl M.,	Westfield.
Jostlyn, May L.,	Brier.
Kendall, Amelia,	Springfield.
Mack, Mary E. M.,	Wilbraham.
McConnell, Mary,	Quincy.
Merrill, James G.,	Lake Helen, Fla.
Moore, Bessie,	Northfield.
Moore, Harriet C.	Holden.
Moore, Ruth E.,	Northfield.
Powers, Eilene,	Leominster.
Powers, Elsie W.,	Leominster.
Reed, James P.,	Hadley.
Shaw, Ethel,	South Amherst.
Smith, Grace C.,	Springfield.
Snyder, Mabel C.	Plainfield.
Thacher, Olive W.,	Beverly.
Treworgy, Everett S.,	Ashby.
Van Der Hoop, Nannette C. W.,	Gay Head.
Van Der Hoop, Pauline,	Gay Head.
Wellington, Catharine J.,	Waltham.
White, Anna C.,	North Hadley.
Wilson, Joseph D.,	Philadelphia, Pa.
Woods, Mary B.,	Hatfield.

Apple Packing School.

Bean, Arthur H.,	Florence.
Burdett, A. E.,	Smiths Ferry.
Clark, George,	Tolland.
Lane, Wm. C.,	Cambridge.
Lathrop, B. M.,	Pittsfield.

Mason, W. B.,	Wrentham.
Mathers, Robert,	Williamsburg.
Wharton, Wm. P.,	Groton.

BEEKEEPERS' SCHOOL.

Bell, Mary,	Bay Side, Long Island, N. Y.
Bellamy, Mrs. John,	Dorchester.
Cole, E. Frances,	Dedham.
Coristine, W. H.,	Amherst.
Floersh, Miss M.,	Amherst.
Russell, Helen W.,	Washington, Conn.
Scott, Russell,	East Alstead, N. H.
Sheridan, Kathleen,	Winchester.
Stanley, Mary B.,	West Hartford, Conn.
Trowbridge, Virginia H.,	New Haven, Conn.

ADDENDUM TO PAGE 31.

Additional entrance credit in agriculture may be allowed in individual cases, if recommended and authorized by the Division of Agriculture of the college. Early application to the head of the Division is advisable, and schools likely to present such candidates are urged to correspond with this officer at once, that the necessary investigation and inspection may be made in time.

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THE M. A. C. BULLETIN

AMHERST, MASS.

Vol. X. No. 1. January, 1918

Published Six Times a Year by the College.

Jan., Feb., Mar., May, Sept., Oct.

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CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE, 1917-1918.

FIFTY-FIFTH ANNUAL REPORT.

PART II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1918.

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1917-1918.



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32 DERNE STREET.
1918.

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approved by the
Supervisor of Administration.

The Commonwealth of Massachusetts.

Massachusetts Agricultural College,
Amherst, Dec. 1, 1917.

To His Excellency Samuel W. McCall.

Sir: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part II. of the fifty-fifth annual report of the trustees, this being the catalogue of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
President.

The Massachusetts Agricultural College.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow. When deemed necessary, additional announcements are made in a supplementary bulletin, published in the spring.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue. Special publication will be made should it become necessary on account of important changes.

CALENDAR.

1917-18-19.

REGULAR COURSES.

1917.

October 10, Wednesday, 1.30 P.M.,	Fall term begins; chapel.
November 28, Wednesday, 12.30 P.M.–Friday, November 30, 1.30 P.M.,	Thanksgiving recess.
December 15, Saturday, 12.30 P.M.,	Fall term ends.
December 17, Monday, 7.30 A.M.,	Winter term begins.
December 22, Saturday, 12.30 P.M.,	Christmas recess begins.
December 31, Monday, 1.30 P.M.,	Christmas recess ends.

1918.

February 23, Saturday, 12.30 P.M.,	Winter term ends.
February 25, Monday, 7.30 A.M.,	Spring term begins.
April 26, Friday, 5.30 P.M.,	Spring term ends.
April 26, 27, Friday, Saturday,	Commencement.
June 27–29, Thursday–Saturday,	Entrance examinations.
September 18–21, Wednesday–Saturday,	Entrance examinations.
September 25,[1] Wednesday, 1.30 P.M.,	Fall term begins; chapel.
November 27, Wednesday, 12.30 P.M.–Friday, November 29, 1.30 P.M.,	Thanksgiving recess.
December 20, Friday, 5.30 P.M.,	Fall term closes.
December 30, Monday, 1.30 P.M.,	Winter term begins.

1919.

March 21, Friday, 5.30 P.M.,	Winter term ends.
March 31, Monday, 1.30 P.M.,	Spring term begins.
May 30, Friday,	Holiday—Memorial Day.
June 21–25, Saturday–Wednesday,	Commencement.
June 25, Wednesday,	Spring term closes.
June 26–28, Thursday–Saturday,	Entrance examinations.
September 17–20, Wednesday–Saturday,	Entrance examinations.
September 24, Wednesday, 1.30 P.M.,	Fall term begins; chapel.

[1] This is the calendar for a normal year; if any modification in the length of terms is made such will be announced in the autumn. The date of opening in 1918 will be as stated above.

Massachusetts Agricultural College.

History. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of nearly all the buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the Federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the Federal station, and subsequently the whole was incorporated with the college.

Courses. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-year[1] course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science, doctor of philosophy and master of agriculture. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and summer school. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, educational exhibits, lecture courses, demonstrations and circulating libraries.

Purpose of the College. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural col-

[1] Twenty-seven teaching departments offer instruction in agriculture, horticulture, sciences, the humanities and rural social science. A system of major courses permits a student to elect major work in 1 of 17 departments, specializing in that and allied subjects for a period of two years.

leges and high schools, for scientific experts in chemistry, entomology, botany and microbiology and for business operations having connection with practical agriculture.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, botany and zoölogy, are an essential preparation. Still other students find the course a desirable education without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which a major course is offered.

Location and Equipment. — The agricultural college is located in the town of Amherst. The grounds comprise more than 600 acres, lying about a mile north of the village center. In addition the college has a demonstration forest of 755 acres, located some 8 miles north of the campus. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

The Massachusetts Agricultural Experiment Station.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was then without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college, and was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about one-half of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to a committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, experimentation and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

THE CORPORATION.

ORGANIZATION OF 1918.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
DAVIS R. DEWEY of Cambridge,	1919
JOHN F. GANNON of Worcester,	1919
ARTHUR G. POLLARD of Lowell,	1920
GEORGE H. ELLIS of West Newton,	1920
ELMER D. HOWE of Marlborough,	1921
EDMUND MORTIMER of Grafton,	1921
NATHANIEL I. BOWDITCH of Framingham,	1922
WILLIAM WHEELER of Concord,	1922
CHARLES A. GLEASON of New Braintree,	1923
JAMES F. BACON of Boston,	1923
FRANK GERRETT of Greenfield,	1924
HAROLD L. FROST of Arlington,	1924
CHARLES H. PRESTON of Danvers,	1925
FRANK A. HOSMER of Amherst,	1925

MEMBERS EX OFFICIO.

His Excellency Governor SAMUEL W. MCCALL, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
PAYSON SMITH, *State Commissioner of Education.*
WILFRID WHEELER, *Secretary of the State Board of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor SAMUEL W. MCCALL of Boston, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
WILFRID WHEELER of Concord, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

STANDING COMMITTEES OF THE CORPORATION.[1]

Committee on Finance.

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
FRANK A. HOSMER.
EDMUND MORTIMER.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, *Chairman.*
FRANK A. HOSMER.
ELMER D. HOWE.
PAYSON SMITH.
DAVIS R. DEWEY.
JOHN F. GANNON.
JAMES F. BACON.

Committee on Farm.

NATHANIEL I. BOWDITCH, *Chairman.*
FRANK GERRETT.
GEORGE H. ELLIS.
EDMUND MORTIMER.

[1] The president of the college is ex-officio member of each standing committee.

Committee on Horticulture.

HAROLD L. FROST, *Chairman.*
CHARLES A. GLEASON.
ELMER D. HOWE.
WILFRID WHEELER.
EDMUND MORTIMER.

Committee on Experiment Department.[1]

CHARLES H. PRESTON, *Chairman.*
WILFRID WHEELER.
ARTHUR G. POLLARD.
HAROLD L. FROST.
EDMUND MORTIMER.

Committee on Buildings and Arrangement of Grounds.

FRANK GERRETT, *Chairman.*
WILLIAM WHEELER.
CHARLES H. PRESTON.
GEORGE H. ELLIS.
JAMES F. BACON.

Committee on Extension Service.

ELMER D. HOWE, *Chairman.*
GEORGE H. ELLIS.
HAROLD L. FROST.
DAVIS R. DEWEY.
NATHANIEL I. BOWDITCH.
JOHN F. GANNON.

Examining Committee of Overseers from the State Board of Agriculture.

JOHN BURSLEY of West Barnstable.
FRANK P. NEWKIRK of Easthampton.
WILLIAM E. PATRICK of Warren.
L. L. RICHARDSON of Leominster.
HOWARD A. PARSONS of Amherst.

[1] The director of the experiment station is a member of the committee on experiment department, without vote.

Officers of the Institution.

[The names of the faculty are arranged in groups according to rank. Within these groups the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held. Changes in personnel occurring after Nov. 30, 1917, are not indicated.]

THE FACULTY.

Kenyon L. Butterfield, A.M., L.L.D., ... President's House.
President of the College and Head of Division of Rural Social Science.

Charles H. Fernald, Ph.D., ... 3 Hallock Street.
Honorary Director of the Graduate School.

Edward M. Lewis, A.M., ... 19 Lincoln Avenue.
Dean of the College and Professor of Languages and Literature.

Fred C. Kenney, ... Mount Pleasant.
Treasurer of the College.

William P. Brooks, Ph.D., ... 6 Farview Way.
Director of the Experiment Station and Lecturer on Soil Fertility.

William D. Hurd,[1] M.Agr., ... 46 Amity Street.
Director of the Extension Service and Supervisor of Short Courses.

Charles E. Marshall, Ph.D., ... 44 Sunset Avenue.
Director of the Graduate School and Professor of Microbiology.

Frank A. Waugh, M.Sc., ... Campus.
Head of Division of Horticulture and Professor of Landscape Gardening.

James A. Foord,[2] M.Sc.Agr., ... 54 Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Management.

Robert J. Sprague, Ph.D., ... Mount Pleasant.
Head of Division of Humanities and Professor of Economics and Sociology.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Goessmann Professor of Chemistry.

Charles Wellington, Ph.D., ... 34 Amity Street.
Professor of Chemistry.

James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science.

Philip B. Hasbrouck, B.Sc., ... Fearing Street.
Registrar of the College and Professor of Physics.

John E. Ostrander, A.M., C.E., ... 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Professor of Entomology, Chairman of Division of Science.

A. Vincent Osmun, M.Sc., ... 16 Northampton Road.
Professor of Botany.

Clarence E. Gordon, Ph.D., ... 38 Lincoln Avenue.
Professor of Zoölogy and Geology.

William R. Hart, A.M., L.L.B., ... 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears, M.Sc., ... Mount Pleasant.
Professor of Pomology.

William P. B. Lockwood, M.Sc., ... 34 North Prospect Street.
Professor of Dairying.

[1] On leave of absence, service with United States Department of Agriculture.

[2] On leave of absence to Jan. 15, 1918.

ALEXANDER E. CANCE, Ph.D., ... 9 Fearing Street.
Professor of Agricultural Economics.
JOSEPH S. CHAMBERLAIN, Ph.D., ... Mount Pleasant.
Professor of Organic and Agricultural Chemistry.
JOHN C. GRAHAM, B.Sc.Agr., ... Lincoln Avenue.
Professor of Poultry Husbandry.
G. CHESTER CRAMPTON, Ph.D., ... The Davenport.
Professor of Insect Morphology.
CHARLES A. PETERS, Ph.D., ... 2 Sunset Avenue.
Professor of Inorganic and Soil Chemistry.
CURRY S. HICKS, B.Pd., ... The Davenport.
Professor of Physical Education and Hygiene.
WILLIAM D. CLARK,[1] A.B., M.F., ... – –
Professor of Forestry.
ERNEST ANDERSON,[2] Ph.D., ... – –
Professor of General and Physical Chemistry.
CHRISTIAN I. GUNNESS, B.Sc., ... 105 Butterfield Terrace.
Professor of Rural Engineering.
HAROLD F. TOMPSON, B.Sc., ... 10 Temple Street, Arlington.
Professor of Market Gardening.
JOHN PHELAN, A.M., ... 29 Northampton Road.
Professor of Rural Sociology.
JOHN C. McNUTT, B.Sc.Agr., ... 33 East Pleasant Street.
Professor of Animal Husbandry.
RICHARD H. WILSON, Colonel, U.S.A., ... The Perry.
Professor of Military Science and Tactics.
ROBERT W. NEAL, A.M., ... Kendrick Place.
Associate Professor of English.
EDGAR L. ASHLEY, A.M., ... 24 Pleasant Street.
Associate Professor of German.
ALEXANDER A. MACKIMMIE, A.M., ... Pine Street, North Amherst.
Associate Professor of French.
BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Associate Professor of Beekeeping.
GEORGE E. GAGE, Ph.D., ... 27 Sunset Avenue.
Associate Professor of Animal Pathology.
WALTER W. CHENOWETH, A.B., M.Sc., ... North Amherst.
Associate Professor of Pomology.
HAROLD E. ROBBINS, B.Sc., A.M., ... 4 Nutting Avenue.
Associate Professor of Physics.
PAUL J. ANDERSON, Ph.D., ... McClure Street.
Associate Professor of Botany.
ARTHUR B. BEAUMONT, B.Sc., ... 103 Butterfield Terrace.
Associate Professor of Agronomy.
RALPH J. WATTS, B.Sc., ... 101 Butterfield Terrace.
Secretary of the College.
CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian of the College.
C. ROBERT DUNCAN, B.Sc., C.E., ... 23 Lincoln Avenue.
Assistant Professor of Mathematics.
ARTHUR K. HARRISON, ... 6 Allen Street.
Assistant Professor of Landscape Gardening.
WILLIAM L. MACHMER,[3] A.M., M.E., ... 3 Kendrick Place.
Assistant Professor of Mathematics.
WALTER E. PRINCE, Ph.B., A.M., ... 4 Kendrick Place.
Assistant Professor of English.
HAROLD M. GORE,[4] B.Sc., ... – –
Assistant Professor of Physical Education.

[1] On leave of absence, service with New England Fuel Administrator.
[2] On leave of absence.
[3] On leave of absence, service with United States Department of Agriculture.
[4] On leave of absence, war service.

ORTON L. CLARK, B.Sc., ... 16 College Street.
Assistant Professor of Botany.
LOYAL F. PAYNE, B.Sc., ... 12 Chestnut Street.
Assistant Professor of Poultry Husbandry.
LORIAN P. JEFFERSON, A.M., ... 84 Pleasant Street.
Assistant Professor in the Division of Rural Social Science.
EARL JONES, M.Sc.Agr., ... 8 Allen Street.
Assistant Professor of Agronomy.
CHARLES H. THOMPSON, M.Sc., ... Mount Pleasant.
Assistant Professor of Horticulture.
ANDREW S. THOMSON, Ph.B., A.M., ... 10½ Kellogg Avenue.
Assistant Professor of Market Gardening, and in charge of Short Courses.
ORVILLE A. JAMISON, M.Sc., ... 7 East Pleasant Street.
Assistant Professor of Dairying.
ARAO ITANO, Ph.D., ... 7 East Pleasant Street.
Assistant Professor of Microbiology.
JOHN T. WHEELER,[1] B.Sc.Agr., ... – –
Assistant Professor of Horticulture.
CHARLES H. PATTERSON, A.B., A.M., ... 26 Lincoln Avenue.
Assistant Professor of English.
AUGUST G. HECHT, B.Sc., ... 3 Mount Pleasant.
Assistant Professor of Floriculture.
BYRON E. PONTIUS, B.Sc.Agr., ... 5½ East Pleasant Street.
Assistant Professor of Animal Husbandry.
FRANK W. RANE, M.F., ... Boston.
Lecturer in Forestry.
HELENA T. GOESSMANN, M.Ph., ... 13 Main Street.
Instructor in English.
——— – –
Instructor in French.
ARTHUR N. JULIAN, A.B., ... 4 Farview Way.
Instructor in German.
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Instructor in Botany.
PAUL SEREX, JR., M.Sc., ... 5 East Pleasant Street.
Instructor in Chemistry.
FREDERICK G. MERKLE, M.Sc., ... East Street.
Instructor in Agronomy.
STANLEY E. VANHORN, ... 20 Amity Street.
Instructor in Dairying.
BURT A. HAZELTINE,[2] B.Sc., ... – –
Instructor in Mathematics.
WILLIAM S. REGAN, Ph.D., ... The Davenport.
Instructor in Entomology.
FRANK P. RAND, A.M., ... North Amherst.
Instructor in English.
WALTER M. PEACOCK, M.Sc.Agr., ... 24 Pleasant Street.
Instructor in Farm Management.
———, ... – –
Instructor in Botany,
HARRY D. DRAIN, B.Sc.Agr., ... 24 Pleasant Street.
Instructor in Dairying.
STANLEY C. BALL, Ph.D., ... 45 Amity Street.
Instructor in Zoölogy.
EGERTON G. HOOD, B.Sc.Agr., ... 15 Spring Street.
Instructor in Microbiology.
OTTO F. WILKINSON, B.Sc., ... 7 Phillips Street.
Instructor in Agricultural Economics.
CHARLES H. GOULD,[3] B.Sc., ... Kendrick Place.
Field Agent.

[1] Resigned, to take effect Dec. 15, 1917.
[2] On leave of absence, war service.
[3] On leave of absence, with Hampshire County Farm Bureau.

LLOYD L. STEWART, B.Sc.Agr., ... 18 Nutting Avenue.
Instructor in Poultry Husbandry.

——, ... – –
Assistant in Physics.

JOSEPH NOVITSKI, ... 30 Cottage Street.
Assistant in Rural Sociology.

THE EXPERIMENT STATION STAFF.

ADMINISTRATION.

WILLIAM P. BROOKS, Ph.D., ... 6 Farview Way.
Director.

JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Vice-Director.

FRED C. KENNEY, ... Mount Pleasant.
Treasurer.

CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.

DEPARTMENT OF AGRICULTURAL ECONOMICS.

ALEXANDER E. CANCE, Ph.D., ... 9 Fearing Street.
In charge of Department.

SAMUEL H. DEVAULT, A.M., ... 39 East Pleasant Street.
Assistant.

DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., ... 6 Farview Way.
Agriculturist.

HENRY J. FRANKLIN, Ph.D., ... Wareham.
In charge of Cranberry Investigation.

EDWIN F. GASKILL, B.Sc., ... North Pleasant Street.
Assistant Agriculturist.

ROBERT L. COFFIN, ... 19 Phillips Street.
Assistant.

DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

A. VINCENT OSMUN, M.Sc., ... 16 Northampton Road.
Botanist.

GEORGE H. CHAPMAN, Ph.D., ... Fearing Street.
Research Physiologist.

PAUL J. ANDERSON, Ph.D., ... McClure Street.
Associate Plant Pathologist.

ORTON L. CLARK, B.Sc., ... 16 College Street.
Assistant Plant Physiologist.

WEBSTER S. KROUT, M.A., ... 46 Pleasant Street.
Field Pathologist.

DEPARTMENT OF ENTOMOLOGY.

HENRY T. FERNALD, Ph.D., ... 44 Amity Street.
Entomologist.

BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Apiarist.

ARTHUR I. BOURNE, A.B., ... 12 East Pleasant Street.
Assistant Entomologist.

STUART C. VINAL, M.Sc., ... 112 Pleasant Street.
Assistant in Entomology.

DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Chemist.

EDWARD B. HOLLAND, Ph.D., ... 28 North Prospect Street.
Associate Chemist in charge of Research Division.

Fred W. Morse, M.Sc., Research Chemist.	40 Pleasant Street.
Henri D. Haskins, B.Sc., In charge of Fertilizer Division.	14 Amity Street.
Philip H. Smith, M.Sc., In charge of Feed and Dairy Division.	102 Main Street.
Lewell S. Walker, B.Sc., Assistant.	19 Phillips Street.
Carlton P. Jones, M.Sc., Assistant.	8 Nutting Avenue.
Carlos L. Beals, M.Sc., Assistant.	4 Kendrick Place.
James P. Buckley, B.Sc., Assistant.	29 Lincoln Avenue.
Windom A. Allen,[1] B.Sc., Assistant.	– –
Bernard L. Peables, B.Sc., Assistant.	4 Kendrick Place.
John B. Smith,[1] B.Sc., Assistant.	– –
Robert S. Scull,[1] B.Sc., Assistant.	– –
James T. Howard, Collector.	46 Pleasant Street.
Harry L. Allen, Assistant.	89 Main Street.
James R. Alcock, Assistant.	North Amherst.

Department of Horticulture.

Frank A. Waugh, M.Sc., Horticulturist.	Campus.
Fred C. Sears, M.Sc., Pomologist.	Mount Pleasant.
Jacob K. Shaw, Ph.D., Research Pomologist.	5 Farview Way.

Department of Meteorology.

John E. Ostrander, A.M., C.E., Meteorologist.	33 North Prospect Street.

Department of Microbiology.

Charles E. Marshall, Ph.D., In charge of Department.	44 Sunset Avenue.
Arao Itano, Ph.D., Assistant Professor of Microbiology.	7 East Pleasant Street.

Department of Poultry Husbandry.

John C. Graham, B.Sc.Agr., In charge of Department.	Lincoln Avenue.
Hubert D. Goodale, Ph.D., Research Biologist.	North Amherst.

Department of Veterinary Science.

James B. Paige, B.Sc., D.V.S., Veterinarian.	42 Lincoln Avenue.
George E. Gage, Ph.D., Associate Professor of Animal Pathology.	27 Sunset Avenue.
John B. Lentz,[1] V.M.D., Assistant in Veterinary Science.	– –
C. Theodore Buchholz,[2] V.M.D., Assistant in Veterinary Science.	– –

[1] On leave of absence; war service. [2] Resigned.

THE EXTENSION SERVICE STAFF.

WILLIAM D. HURD,[1] M.Agr., ... 46 Amity Street.
Director and Supervisor of Short Courses.

AUSTIN D. KILHAM, B.Sc.Agr., ... 12 Nutting Avenue.
Extension Assistant Professor of Pomology. Acting Director, 1917–18.

SUMNER R. PARKER, B.Sc., ... 51 Amity Street.
Extension Professor of Rural Organization and County Agent Leader.

GEORGE L. FARLEY, M.Sc., ... 31 Lincoln Avenue.
Supervisor of Junior Extension Work.

EZRA L. MORGAN, A.M., ... 2 Allen Street.
Extension Professor of Community Planning.

LAURA COMSTOCK, ... 84 Pleasant Street.
Extension Professor of Home Economics and Leader of County Work for Women.

ALFRED G. LUNN, B.Sc., ... North Amherst.
Extension Professor of Poultry Husbandry.

E. FARNHAM DAMON, B.Sc., ... 35 South Pleasant Street.
Extension Associate Professor of Agricultural Economics.

WESLEY H. BRONSON,[2] B.Sc., ... – –
Extension Assistant Professor of Farm Demonstration.

WILLIAM F. TURNER, B.Sc., ... 37 Cottage Street.
Extension Assistant Professor of Animal Husbandry.

FRANK A. C. SMITH,[3] B.Sc., ... The Davenport.
Extension Assistant Professor of Landscape Gardening.

MARIE SAYLES,[1] B.Sc., ... 79 Pleasant Street.
Extension Assistant Professor of Home Economics.

VICTOR A. RICE, B.Sc.Agr., ... 24 Pleasant Street.
Extension Instructor in charge of Pig Club Work.

L. WAYNE ARNY, B.Sc., ... 7 Allen Street.
Supervisor of Correspondence Courses and Editor of Extension Service Publications.

HELEN NORRIS, ... 16 Nutting Avenue.
Extension Instructor in Agricultural Education.

BERNARD W. SHAPER, B.Sc., ... 24 Pleasant Street.
Assistant to the Director.

ROSWELL W. HENNINGER,[2] B.Sc., ... – –
Extension Instructor in charge of Poultry Club Work.

ALBERT L. DEAN,[4] 24 Pleasant Street.
Extension Instructor in charge of Poultry Club Work.

RALPH E. VAN METER,[4] B.Sc.Agr., ... 24 Pleasant Street.
Extension Instructor in Pomology.

THE CLERICAL STAFF.

ELBERT L. ARNOLD, ... McClellan Street.
Chief Clerk, Extension Service.

ELLA B. BALDWIN, ... 73 Pleasant Street.
Clerk, Extension Service.

ELEANOR F. BISHOP, ... 3 Spaulding Street.
Bookkeeper, Treasurer's Office.

EVELYN BREWSTER, B.Sc., ... 16 Nutting Avenue.
Clerk, President's Office.

JOHN K. BROADFOOT, ... 7½ East Pleasant Street.
Cashier, Treasurer's Office.

LENA V. CHAPMAN, ... 77 South Pleasant Street.
Library Assistant.

LUCIA G. CHURCH, ... North Amherst.
First Clerk, Experiment Station.

[1] On leave of absence; service with United States Department of Agriculture.
[2] On leave of absence; war service.
[3] On leave of absence; war service from Jan. 1, 1918.
[4] Temporary appointment.

Bertha E. Connelly, ... Phillips Street.
Stenographer, Division of Rural Social Science.
Lalia M. Damon, ... 10 Nutting Avenue.
Cataloguer, Library.
Emily Davidson, ... 7 Northampton Road.
Telephone Operator, Stockbridge Hall.
Louise G. Davidson,[1] 7 Northampton Road.
Telephone Operator, Stockbridge Hall.
Llewelyn L. Derby,[2] 81 Pleasant Street.
Assistant, Department of Physical Education.
Hazel A. Dewar, ... 6 High Street.
Stenographer, Division of Agriculture.
Marion F. Dondale, A.B., ... 101 Butterfield Terrace.
Clerk, Graduate School and Department of Microbiology.
Noella Duval, ... 34 McClellan Street.
Clerk, Power Plant.
Margaret Evens, ... 73 Pleasant Street.
Stenographer, Extension Service.
F. Ethel Felton, A.B., ... 7 Allen Street.
Clerk and Editorial Assistant, Experiment Station.
Lina M. Fisher, ... 28 Pleasant Street.
Clerk, Department of Chemistry.
Grace E. Gallond, ... 28 Pleasant Street.
Clerk, Department of Dairying.
Margaret T. Gaskell, ... 105 Main Street.
Stenographer, Offices of Dean and Registrar.
Lillian M. Gelinas, ... 77 Pleasant Street.
Clerk, President's Office.
Cora B. Grover, ... North Amherst.
Clerk, Extension Service.
Marion G. Guertin,[1] – –
Stenographer, Department of Beekeeping.
Lillian S. Hadfield, ... 16 Nutting Avenue.
Clerk, Extension Service.
Laura M. Hager, A.B., ... South Deerfield.
Clerk, Department of Agricultural Economics.
Mary G. Hanifin, ... Northampton.
Clerk, Division of Agriculture.
Mary E. Horton, ... 79 Pleasant Street.
Clerk, Department of Rural Sociology.
Alice M. Howard, ... North Amherst.
First Clerk, Experiment Station.
Marion M. Kelsey, ... Belchertown Road.
Clerk, Treasurer's Office.
Clarence E. Kendall, ... Hadley.
Mailing Clerk, Extension Service.
Ethel L. Kennedy, ... 8 Allen Street.
Clerk, Extension Service.
—— ——, ... – –
Stenographer, Department of Entomology.
Rachael G. Leslie, ... Allen Street.
Clerk, Department of Poultry Husbandry.
Grace MacMullen, A.B., ... 87 Pleasant Street.
Clerk, Department of Poultry Husbandry.
Irene A. Martin, ... 19 South East Street.
Stenographer, Treasurer's Office.
Rebecca L. Mellor, ... 10 Kellogg Avenue.
Clerk, Experiment Station.
Gladys I. Miner, ... South Deerfield.
Clerk, Extension Service.
Elisabeth E. Mooney, ... Northampton.
Clerk, Department of Poultry Husbandry.

[1] Resigned. [2] On leave of absence; war service from Dec. 8, 1917.

MARION NORTON, A.B., ... 87 Pleasant Street.
Library Assistant.
BRIDIE E. O'DONNELL, ... Hadley.
Clerk, Department of Entomology.
HAZEL PARKER, ... North Amherst.
Stenographer, Division of Horticulture.
HELEN C. POMEROY, ... North Amherst.
Clerk, Department of Floriculture.
FRANCES POWERS, ... 44 Lincoln Avenue.
Stenographer, Department of Dairying.
EDITH ROBINSON, ... South Deerfield.
Clerk, Department of Beekeeping.
MARY I. SHORES, ... 35 South Pleasant Street.
Clerk, Dean's Office.
ELIZABETH STRACHAN, ... 17 High Street.
Clerk, Treasurer's Office.
ETHELYN STREETER, ... 55 Amity Street.
Clerk, Division of Horticulture.
FLORA E. TORREY, ... 21 North Prospect Street.
Clerk, Extension Service.
ETHEL M. TURNER, ... 55 Pleasant Street.
Library Assistant.
OLIVE M. TURNER, B.Sc., ... 22 Spaulding Street.
Clerk, Registrar's Office.
ELLEN L. WELCH, A.B., ... Hadley.
Clerk, Department of Botany.
AURELIA B. WENTWORTH, ... South Amherst.
First Clerk, Division of Agriculture.
MAE HOLDEN WHEELER, B.Sc., ... 7 Phillips Street.
Curator, Department of Botany.

STAFF OF OPERATING AND MAINTENANCE.

JOHN J. BARBER, ... Campus.
Farm Superintendent.
THOMAS BUTTERWORTH, ... 3 Phillips Street.
Engineer.
JOHN L. BYARD, ... 21 Pleasant Street.
Superintendent of the Apiary.
LAWRENCE S. DICKINSON, B.Sc., ... 2 Farview Way.
Superintendent of Grounds.
CLARENCE A. JEWETT, ... 112 Pleasant Street.
Superintendent of Buildings.
ORA L. KENNEDY, ... Draper Hall.
Manager of the Dining Hall.
JOHN J. LEE, ... 38 Cottage Street.
Assistant to the Military Detail.
FLORENCE LEVENSALER, ... Infirmary.
Resident Nurse.
GEORGE F. PUSHEE, ... Northampton.
Shop Assistant, Rural Engineering.
JAMES WHITING, ... 16 Hallock Street.
Foreman, Department of Floriculture.

GRADUATE ASSISTANTS.

HARRY A. CHEPLIN,[1] – –
Department of Microbiology.
FRANK N. FAGAN, B.Sc.Agr., ... 75 Pleasant Street.
Department of Pomology.
THOMAS B. GORDON, B.Sc.Agr., ... 24 Pleasant Street.
Department of Agronomy.

[1] Resigned.

Louise Hompe, A.B., Department of Microbiology.	9 Phillips Street.
Conrad H. Lieber, B.Sc., Department of Microbiology.	– –
Ralph L. MacNeil, B.Sc., Department of Chemistry.	– –
James E. Martin,[1] Department of Microbiology.	– –
Satwaji G. Mutkekar, M.Sc., Department of Microbiology.	Draper Hall.
James M. Neill, B.Sc., Department of Microbiology.	15 Phillips Street.
William C. Pauley, B.Sc., Department of Landscape Gardening.	24 Pleasant Street.
James A. Purington, B.Sc., Department of Agronomy.	– –
George B. Ray, B.Sc., Department of Microbiology.	3 Nutting Avenue.
Donald White, A.B., Department of Botany.	24 Pleasant Street.
Carrick E. Wildon, B.Sc., Department of Floriculture.	66 Pleasant Street.
Elwin G. Wood,[1] B.Sc., Department of Pomology.	– –

[1] Resigned.

Standing Committees of the Faculty.

1917-18.

Catalogue and Other Publications.
Associate Professor Neal.
Professor Lockwood.
Secretary Watts.

Commencement.
Dean Lewis.
Treasurer Kenney.
Colonel Wilson.
Professor Peters.
Associate Professor Robbins.
Secretary Watts.
Assistant Professor Hecht.

Course of Study.
President Butterfield.
Dean Lewis.
Professor Hart.
Professor Waugh.
Professor Foord.
Professor Sprague.
Professor Fernald.
Professor Ostrander.
Professor Marshall.
Professor Chamberlain.
Professor Cance.
Associate Professor Chenoweth.

* Discipline (Advisory).
Dean Lewis.
Registrar Hasbrouck.
Professor Hicks.
Professor Phelan.
Professor Gunness.

Employment.
Professor Sears.
Dean Lewis.
Treasurer Kenney.
Professor Lockwood.
Professor McNutt.
Secretary Watts.

ENTRANCE EXAMINATIONS AND ADMISSION.

Registrar HASBROUCK.
Dean LEWIS.
Professor OSMUN.
Associate Professor ASHLEY.
Assistant Professor PATTERSON.
Assistant Professor DUNCAN.
Mr. RAND.

HEALTH AND SANITATION.

Professor MARSHALL.
Treasurer KENNEY.
Colonel WILSON.
Professor HICKS.
Miss COMSTOCK.

LIBRARY.

Professor MARSHALL.
Professor SPRAGUE.
Professor GUNNESS.
Assistant Professor A. S. THOMSON.
Mr. GREEN.

SCHEDULE.

Professor LOCKWOOD.
Professor PETERS.
Assistant Professor DUNCAN.

SCHOLARSHIP.

Dean LEWIS.
Registrar HASBROUCK.
Professor CHAMBERLAIN.
Professor PHELAN.
Associate Professor MACKIMMIE.
Associate Professor ROBBINS.
Assistant Professor PATTERSON.
Mr. RAND.

STUDENT LIFE.

President BUTTERFIELD.
Dean LEWIS.
Treasurer KENNEY.
Director HURD.
Professor CHAMBERLAIN.
Professor SPRAGUE.
Professor HART.
Professor CRAMPTON.
Professor PHELAN.
Professor LOCKWOOD.
Professor GUNNESS.
Professor HICKS.
Associate Professor MACKIMMIE.
Associate Professor ROBBINS.
Secretary WATTS.
Associate Professor PAUL J. ANDERSON.
Assistant Professor HARRISON.
Assistant Professor PATTERSON.
Assistant Professor A. S. THOMSON.

Unclassified Students.

Dean Lewis.
Professor Waugh.
Professor Foord.
Registrar Hasbrouck.
Assistant Professor Patterson.

Appointed to Athletic Board.

Dean Lewis.
Registrar Hasbrouck.
Professor Osmun.

Appointed to Non-Athletic Board.

Professor Lockwood.
Assistant Professor Patterson.

THE COLLEGE.

THE
JOHN CRERAR
LIBRARY

ADMISSION.

A. Application for Admission.

All correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. Modes of Admission.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

Certificates. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present at least three of the necessary fourteen credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

Examinations. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

In June, ...	Amherst, Department of Physics building. Massachusetts Institute of Technology, Cambridge, Mass. Worcester, Horticultural Hall.
In September, ...	Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 27-29, inclusive, 1918. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M.	Registration.
8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Solid geometry.
4.00 P.M.	Physics.

Second Day.

8.00 A.M.	Required English.
11.00 A.M.	Algebra.
2.00 P.M.	History, required and elective.

Third Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1918, the examinations will be given September 18-21, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M.	Registration.
1.15-5.00 P.M.	Greek A and B.

Second Day.

8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Solid geometry.
4.00 P.M.	Physics.

Third Day.

8.00 A.M.	Required English.
11.00 A.M.	Algebra, agriculture.
2.00 P.M.	History, required and elective.

Fourth Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

C. Requirements for Admission.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year. **Neither more nor less credit will be given in any subject than is indicated in the table below.** Fourteen units must be offered for admission. In the list given below, *every subject in black-faced type is prescribed and no substitution is allowed.* The subjects so typed total eight and one-half units. In addition to these points five and one-half more units must be chosen from the subjects printed in light-faced type. Not more than four half-credit units may be offered. No applicant deficient in both algebra and plane geometry will be admitted.

Agriculture,[1]	½ or 1 (or 3)*
Botany,[2]	½ or 1
Chemistry,[2]	1
Algebra,	1½
Plane geometry,	1
Solid geometry,	½
Trigonometry,	½
Physics,[2]	1
Geology,	½
Physiography,	½
Physiology,	½
Zoölogy,[2]	½
History[3] (Ancient; Medieval and Modern; English; General; United States and Civics), *any one,*	1[4]
English 1,	1½
English 2,	1½
Modern Language (elementary French or elementary German),	2
Elementary French,[5]	2
Elementary German,[5]	2
Intermediate French,	1
Advanced French,	1
Intermediate German,	1
Advanced German,	1
Greek A,[1]	2
Greek B,[1]	1
Latin A,	2
Latin B,	1
Commercial geography,[6]	½
Drawing,[6]	½
Manual training,[6]	½ or 1

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, below).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books, but their certificates must state that note-books have been satisfactorily completed.

*** This additional entrance credit in agriculture may be allowed in individual cases, if recommended and authorized by the Division of Agriculture of the college. Early application to the head of the division is advisable, and schools likely to present such candidates are urged to correspond with this officer at once, that the necessary investigation and inspection may be made in time.**

[1] Examination in September only.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] One must be offered for the required point; one, two or three others may be offered for elective points.

[4] For each offered.

[5] May be offered as elective if not offered to satisfy *prescribed* points.

[6] On certificate only, no examination given.

D. Statement of Preparation Required for Admission.

Agriculture. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade. **The examination in agriculture will be given in September only.**

Botany. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Steven's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements. The keeping of a note-book is required.

Mathematics. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynominals and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binominal theorem for positive integral exponents, the formulas for the nth term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the

sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

Physics. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Text-book of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

Physiology. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

Zoölogy, Physiography, Geology. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

History. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers,

in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

English. — For 1916–19 inclusive: —

The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature* (One and One-half Units). — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lines of the authors whose works he reads and with their place in literary history.

A. Reading. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I. : —

Group I. Classics in Translation: The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of Books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of Books XI., XIII., XIV., XV., XVIII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any one selection from Group I. a selection from any other group may be substituted.

Group II. Shakspere: "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo

and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"[1] "Macbeth;"[1] "Hamlet."[1]

Group III. Prose Fiction: Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voyages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one;* Jane Austen's novels, any *one;* Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens' novels, any *one;* Thackeray's novels, any *one;* George Eliot's novels, any *one;* Mrs. Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reade's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevenson's "Treasure Island" or "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one;* Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables" or "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

Group IV. Essays, Biography, etc.: Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tatler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" selections from Irving's "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" selections from Lamb's "Essays of Elia" (about 100 pages); selections from Lockhart's "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison and Steele in the English Humorists;" Macaulay: any one of the following essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay;" selections from Trevelyan's "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years Before the Mast;" Lincoln's "Selections," including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address, the letter to Horace Greeley, together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's "autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson and later writers; a collection of "Letters" by various standard writers.

Group V. Poetry: Palgrave's "Golden Treasury" (first series), Books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury (first series), Book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens" and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake" or "Marmion;"

[1] If not chosen for study under B.

Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The Armada," "Ivry;" Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Herve Riel," "Pheidippides," "My Lost Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum" and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

B. Study. — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. Drama: Shakspere's "Julius Cæsar," "Macbeth," "Hamlet."

Group II. Poetry: Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

Group III. Oratory: Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

Group IV. Essays: Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading.

The examination in literature will include: —

(*a*) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above.

(*b*) A test on the books prescribed for study, which will consist of questions upon their content and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

French. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

German. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

Greek. — Greek will receive credit as an elective requirement upon either examination or certification, as follows. **(The examination in Greek A and Greek B will be given in September only.)**

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

Latin. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either Books I. to VI. of Virgil's "Æneid," or six orations of

Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," Books I. to IV.

Commercial Geography.[1] — Preparation should be made in a course equivalent to that laid down in Adams' "Commercial Geography," Trotter's "Geography of Commerce," or a similar work. (No examination given.)

Drawing.[1] — The applicant may offer either freehand or mechanical drawing or both. He must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable him to draw correctly a simple geometric model from memory; or, if he present mechanical drawing, he must have working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented, see "Manual Training." (No examination given.)

Manual Training.[1] — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

E. Admission to Advanced Standing.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. Other Information about Entrance.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed.

[1] On certificate only; no examination given.

Not more than five and one-half credits from the elective group will be accepted. No candidate deficient in both algebra and plane geometry will be admitted.

4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination during the first week of the second term. (2) Second entrance condition examination before the beginning of the period of final examinations of the second term, upon the payment of a fee of $5 to the treasurer.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

G. Unclassified Students.

All requests for information concerning admission of unclassified students should be addressed to Dean Edward M. Lewis, chairman of committee on unclassified students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. All unclassified students are subject to the supervision of a special committee.

2. No applicant under eighteen years of age will be admitted as an unclassified student.

3. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-year high school course or its equivalent, or that they are graduates of a county agricultural school of Massachusetts, and furnish satisfactory testimonials as to moral character.

4. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

5. Each unclassified student must take from the regular technical elective courses, and necessary prerequisites, a minimum of twelve credit hours a week.

6. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

7. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 60 per cent. An unclassified student who passes in less than 60 per cent. of his work will be dropped from college.

8. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than six terms without the special permission of the faculty.

9. No unclassified student shall be allowed to participate in any intercollegiate contests.

10. Unclassified students are subject to the general regulations applying to classified students.

11. Every unclassified student should clearly understand that before any application for transfer to the regular registration for the Bachelor of Science degree will be considered by the registrar, he must present all entrance credits either by certificate or by examination in the same way as is required of a student who enters regularly.

H. One-year Vocational Course in Poultry Husbandry.

Purpose. — This course is designed for graduates of the agricultural vocational schools and others who wish to prepare themselves for practical poultry keeping and can spend only one year at college.

Scope. — The work covers seven detailed courses in poultry husbandry, as well as short-course work in fruit growing, market gardening, bee culture, animal husbandry or other subjects that will be helpful to poultry raisers. In addition to classroom and laboratory exercises each student is required to put in from 25 to 30 hours per week at the plant in the care and management of poultry for the purpose of becoming proficient in the various branches of the work.

Entrance Requirements. — Applicants must be at least eighteen years of age and have a good elementary education.

Fees. — There is no tuition for residents of Massachusetts, but a laboratory fee of $5 is required for both the fall and spring terms.

Note. — The course is limited to 16 students.

Courses of Instruction.

TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

Freshman Year.

First Term.

All work required.

Subject.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 1 or 4,	3
Algebra,	Mathematics 1,	5
Language,	French or German 1 or 4,	3
English,	English 1,	3
Agriculture,	Agronomy 1,	3
Tactics,	Military 1,	1
Drill,	Military 4,	2
Hygiene,	Physical Education 1,	1
Public speaking,	Public Speaking 1 (one-third of the class),	1
		22

College life (attendance without credit).

Second Term.

Chemistry,	Chemistry 2 or 5,	3
Algebra,	Mathematics 2,	2
Trigonometry,	Mathematics 5,	3
Language,	French or German 2 or 5,	3
English,	English 2,	3
Agriculture,	Agronomy 1, Animal Husbandry 1,	3
Tactics,	Military 2,	1
Drill,	Military 5,	1
Geology,	Geology 2,	2
Public speaking,	Public Speaking 1 (one-third of class),	1
		22

College life (attendance without credit).

Freshman Year — *Concluded.*

Third Term.

Subject.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 3 or 6,	3
Agriculture,	Agronomy 1,	3
Solid geometry,	Mathematics 3,	3
Mensuration,	Mathematics 6,	2
Language,	French or German 3 or 6,	3
English,	English 3,	3
Botany,	Botany 3,	3
Tactics,	Military 3,	1
Drill,	Military 6,	2
Recreation,	Physical Education 3,	1
Public speaking,	Public Speaking 1 (one-third of class),	1
		25

College life (attendance without credit).

Sophomore Year.

First Term.

Subject.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
Required.				
Physics,	25	3	1	4
Zoölogy,	25	2	2	4
Botany,	25	1	2	3
English,	25	2	–	2
Military,	25	1	–	1
Military,	28	–	2	2
Total required,	–	–	–	16
Elective.				
Chemistry,	25	1	2	3
French,	25 or 28	3	–	3
German,	25 or 28	3	–	3
Drawing,	25	–	3	3
Animal husbandry,	25	2	1	3
Rural engineering,	25	–	2	2

Sophomore Year — *Concluded.*

Second Term.

Subject.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
Required.				
Physics,	26	2	1	3
Agricultural economics,	26	5	–	5
English,	26	2	–	2
Military,	26	1	–	1
Military,	29	–	2	1
	–	–	–	12
Elective.				
Chemistry,	26	1	2	3
French,	26 or 29	3	–	3
German,	26 or 29	3	–	3
Mathematics,	26	2	–	2
Drawing,	26	–	3	3
Entomology,	26	3	–	3
Animal husbandry,	26	1	2	3
Rural engineering,	26	–	2	2
Botany,	26	1	2	3
Economic sociology,	26	5	–	5

Third Term.

Required.				
Rural sociology,	27	3	–	3
Agronomy,	27	4	1	5
English,	27	2	–	2
Military,	27	1	–	2
Military,	30	–	2	2
Physical education,[1]	26	–	1	1
Total required,	–	–	–	15
Elective.				
Chemistry,	27	1	4	5
Chemistry,	30	3	2	5
French,	27 or 30	3	–	3
German,	27 or 30	3	–	3
Mathematics,	27	–	3	3
Drawing,	27	–	3	3
Entomology,	27	–	2	2
Geology,	27	3	2	5
Physics,	27	4	1	5
Horticulture,	27	2	1	3
Zoölogy,	27	1	2	3

[1] Credit for Physical Education 2 and 3 given in third term.

MAJORS: JUNIOR AND SENIOR YEARS.

General Statement.

A major consists of 45 credit hours of correlated work, to be arranged by the student and an instructor called the adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

Rules governing Majors.

Rule 1. *Election.* — Each student, before the first term of his junior year, shall elect a major subject from the list of majors given below; and this major shall consist of 45 credit hours of correlated work.

Rule 2. *Minimum Credits.* — The minimum number of credits for graduation shall be 234 credit hours, inclusive of military drill and physical education.

Rule 3. *Maximum Credits.* — The maximum number of credits for any term of the junior or senior year shall be 22; the minimum shall be 19.

Rule 4. *Humanities and Rural Social Science.* — A minimum of 18 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 5 credit hours will be required in each of the divisions, except that the minimum for the class of 1918 shall be 22 hours.

Rule 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 45 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

Rule 6. *Free Electives.* — Each student during his junior and senior years is required to take 45 hours in his major and also 18 hours in the Divisions of the Humanities and Rural Social Science, making a total of 63 hours (but see Rule 4). He is allowed free choice of courses to complete his required hours.

Rule 7. *Registration.* — No junior or senior shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office three weeks before the close of each term.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the succeeding term and countersign the card.

(3) Each course card must be filled out, giving the name of student, his college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours

of free elections added by the student, the card must be returned to the registrar one week before the beginning of the final examination period.

Rule 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by the committee on scholarship, they become operative at the beginning of the term following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

Agriculture. (Major.)

Professor James A. Foord, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 I.	5	I.	Animal Husbandry 25,	3	Agronomy 50,	5	Animal Husbandry 75,	3
Agronomy,	76 III.	5		Rural Engineering 25,	2	Dairying 50,	5	Rural Engineering 75,	5
Animal Husbandry,	51 III.	3							
Animal Husbandry,	75 I.	3	II.	Mathematics 26,	2			Farm Management 75,	3
Animal Husbandry,	76 II.	3		Animal Husbandry 26,	3			Animal Husbandry 76,	3
Dairying,	50 I.	5		Rural Engineering 26,	2				
Farm Management,	75 II.	3	III.	Chemistry 30,	5	Microbiology 50,	5	Agronomy 76,	5
Farm Management,	76 III.	5		Mathematics 27,	3	Animal Husbandry 51,	3	Farm Management 76,	5
Microbiology,	50 I.			Horticulture 27,	3				
or		5							
Microbiology,	50 III.		IV.						
Rural Engineering,	75 I.	5							
		42							

Sophomore Elective Prerequisites (Required). — Animal Husbandry 25 and 26, Rural Engineering (shop work) 25 and 26, Chemistry 30, Mathematics 26 and 27, and Horticulture 27.

Additional Information. — Dairying 75, Pomology 50 and 51, Rural Engineering 78, and Veterinary 51 and 78 are suggested as additional courses for the student fitting himself for general agriculture.

Agronomy. (Major.)

Associate Professor Arthur B. Beaumont, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 I.	5	I.	Chemistry 25,	3	Agronomy 50,	5	Agronomy 75,	3
Agronomy,	51 III.	5		German 25 or 28,	3	Chemistry 51,	8	Animal Husbandry 75,	5
Agronomy,	75 I.	5							
Agronomy,	77 II.	5	II.	Botany 26,	3	Chemistry 52,	8	Agronomy 77,	5
Animal Husbandry,	75 I.	3		Chemistry 26,	3				
Chemistry,	51 I.	8		German 26 or 29,	3				
				Mathematics 26,	2				
Chemistry,	52 II.	8	III.	German 27 or 30,	3	Agronomy 51,	5	Farm Management 76,	5
Farm Management,	76 III.	5		Mathematics 27,	3				
				Geology 27,	5				
		44							
			IV.						

Sophomore Elective Prerequisites (Required). — Chemistry 25 and 26, German 25 or 28, 26 or 29, 27 or 30, Geology 27, Botany 26.
Advised. — Mathematics 26 and 27.

Animal Husbandry. (Major.)

Professor John C. McNutt, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 I.	5	I.	Animal Husbandry 25,	3	Agronomy 50,	5	Animal Husbandry 75,	3
Animal Husbandry,	51 III.	3				Veterinary 50,	5		
Animal Husbandry,	50 II.	1				Dairying 50,	5		
Animal Husbandry,	52 III.	3	II.	Animal Husbandry 26,	3	Animal Husbandry 50,	1	Animal Husbandry 76,	3
Animal Husbandry,	75 I.	3						Animal Husbandry 78,	3
Animal Husbandry,	76 II.	3						Farm Management 75,	3
Animal Husbandry,	77 III.	3	III.	Chemistry 30,	5	Animal Husbandry 51,	3	Animal Husbandry 80,	1
Animal Husbandry,	78 II.	3				Animal Husbandry 52,	3	Animal Husbandry 77,	3
Animal Husbandry,	80 III.	1						Farm Management 76,	5
Dairying,	50 I.	5	IV.						
Farm Management,	75 II.	3							
Farm Management,	76 III.	5							
Veterinary,	50 I.	5							
		43							

Sophomore Elective Prerequisites (Required). — Animal Husbandry 25 and 26, Chemistry 30.

Additional Information. — The balance of the sophomore electives allowed are left to the student to choose.

Dairying. (Major.)

Professor William P. B. Lockwood, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Animal Husbandry,	52 III.	3	I.	Animal Husbandry 25,	3	Dairying 50,	5	Animal Husbandry 75,	3
Animal Husbandry,	75 I.	3		Rural Engineering 25,	2	Microbiology 50,	5	Microbiology 82,	5
Animal Husbandry,	76 II.	3							
Dairying,	50 I.	5	II.	Animal Husbandry 26,	3	Rural Engineering 77,	5	Farm Management 75,	3
Dairying,	51 III.	5		Rural Engineering 26,	2	Microbiology 51,	5	Animal Husbandry 76,	3
Dairying,	75 II.	5				(Prerequisite to 82.)		Dairying 75,	5
Dairying,	76 III.	5	III.	Chemistry 30,	5	Animal Husbandry 52,	3	Dairying 76,	5
Farm Management,	75 II.	3				Dairying 51,	5		
Microbiology,	50 I.	5							
Microbiology,	82 I.	5							
Rural Engineering,	77 II.	5	IV.						
		47							

Sophomore Elective Prerequisites (Required). — Animal Husbandry 25 and 26, Rural Engineering 25 and 26, Chemistry 30.

Additional Information. — The balance of the sophomore electives allowed are left to the student to choose.

Poultry Husbandry. (Major.)

Professor John C. Graham, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics,	75 **I.**	5	**I.**			Poultry 50,	3	Poultry 76,	5
Animal Husbandry,	51 **III.**	3				Poultry 51,	2	Poultry 77,	5
Poultry Husbandry,	50 **I.**	3				Agricultural Economics 75,	5	Pomology 50,	3
Poultry Husbandry,	51 **I.**	2	**II.**			Poultry 52,	3	Poultry 75,	5
Poultry Husbandry,	52 **II.**	3						Veterinary 86,	3
Poultry Husbandry,	53 **III.**	5							
Poultry Husbandry,	54 **III.**	2	**III.**			Poultry 53,	5		
Poultry Husbandry,	75 **II.**	5				Poultry 54,	2		
Poultry Husbandry,	76 **I.**	5				Animal Husbandry 51,	5		
Poultry Husbandry,	77 **I.**	5	**IV.**						
Pomology,	50 **I.**	3							
Veterinary Science,	86 **II.**	3							
		44							

Sophomore Recommendations. — Students intending to major in Poultry Husbandry are urged to take Zoölogy 27.
Advised. — Juniors who did not take Zoölogy 27 as sophomores are strongly advised to include it in their program.

Floriculture.

Assistant Professor August G. Hecht, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 **I.**	2	I.	Drawing 25,	3	Floriculture 50,	4	Floriculture 75,	3
Botany,	51 **II.**	2				Floriculture 53,	3	Horticulture 50,	5
Entomology,	26 **II.**	3				Botany 50,	2		
Floriculture,	50 **I.**	4	II.	Drawing 26,	3	Floriculture 51,	4	Floriculture 77,	3
Floriculture,	51 **II.**	4		Entomology 26,	3	Floriculture 54,	3	Floriculture 76,	3
Floriculture,	52 **III.**	4		Botany 26,	3	Entomology 26,	5		
						Botany 51,	2		
Floriculture,	53 **I.**	3	III.	Drawing 27,	3	Floriculture 52,	4	Floriculture 80,	3
Floriculture,	54 **II.**	3		Entomology 27,	2	Floriculture 78,	3	Horticulture 51,	5
Floriculture,	75 **I.**	3		Horticulture 27,	3				
Floriculture,	76 **II.**	3							
Floriculture,	77 **II.**	3	IV.						
Floriculture,	78 **III.**	3							
Floriculture,	80 **III.**	3							
Horticulture,	50 **I.**	5							
Horticulture,	51 **III.**	5							
		50							

Sophomore Elective Prerequisites. — Drawing 25, 26 and 27, Entomology 26 and 27, Botany 26 and Horticulture 27.

Additional Information. — The rest of the sophomore electives allowed are left to the student to choose. Horticulture 50 and 51 will be taken by seniors.

Advised. — The department advises all students who major in this subject to take Botany 78 and Landscape Gardening 75.

Forestry. (Major.)

Professor William D. Clark, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 **I.**	2	**I.**	Drawing 25,	3	Forestry 50,	3	Forestry 75,	5
Botany,	50 **II.**	2		Rural Engineering 25,	2	Landscape Gardening 50,	5		
Entomology,	75 **III.**	4				Horticulture 50,	5		
						Botany 50,	2		
Forestry,	50 **I.**	3	**II.**	Drawing 26,	3	Forestry 51,	3		
Forestry,	51 **II.**	3		Mathematics 26,	2	Botany 51,	2		
Forestry,	53 **III.**	3		Entomology 26,	3	Landscape Gardening 51,	4		
Forestry,	54 **IV.**	5		Botany 26,	3				
Forestry,	75 **I.**	5	**III.**	Drawing 27,	3	Forestry 53,	3	Forestry 78,	3
Forestry,	78 **III.**	3		Mathematics 27,	2	Horticulture 51,	5		
Horticulture,	50 **I.**	5		Entomology 27,	3	Entomology 75,	4		
				Horticulture 27,	3				
Horticulture,	51 **III.**	5	**IV.**			Landscape Gardening 53,	5		
Landscape Gardening,	50 **I.**	5				Forestry 54,	5		
Landscape Gardening,	51 **II.**	4							
		49							

Sophomore Elective Prerequisites (Required). — Drawing 25, 26 and 27, Rural Engineering 25, Mathematics 26 and 27, Entomology 26 and 27, Botany 26, Horticulture 27.

Additional Information. — Substitutions according to individual needs may be made in conference with the adviser.

Landscape Gardening. (Major.)

Professor Frank A. Waugh, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Horticulture,	50 **I.**	5	**I.**	Drawing 25,	3	Landscape Gardening 50,	5	Landscape Gardening 75,	3
Horticulture,	51 **III.**	5				Horticulture 50,	5		
Landscape Gardening,	50 **I.**	5				Drawing 25,	3		
Landscape Gardening,	51 **II.**	4	**II.**	Drawing 26,	3	Landscape Gardening 51,	4	Landscape Gardening 76,	4
Landscape Gardening,	52 **III.**	5		Mathematics 26,	2	Drawing 26,	3		
Landscape Gardening,	53 **IV.**	5		Entomology 26,	3				
Landscape Gardening,	75 **I.**	3	**III.**	Drawing 27,	3	Landscape Gardening 52,	5	Landscape Gardening 78 or 79,	3
Landscape Gardening,	76 **II.**	4		Mathematics 27,	3	Horticulture 51,	5	Landscape Gardening 77,	4
Landscape Gardening,	77 **III.**	4		Horticulture 27,	3	Drawing 27,	3		
						Landscape Gardening 78 or 79,	3		
Landscape Gardening,	78 **III.**	3	**IV.**			Landscape Gardening 53,	5		
or									
Landscape Gardening,	79 **III.**	3							
		46							

Sophomore Elective Prerequisites (Required). — Drawing 25, 26 and 27, Mathematics 26 and 27, Horticulture 27.

Additional Information. — Modifications may be permitted when they appear advisable.

Pomology. (Major.)

Professor Fred C. Sears, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	75 **I.**	5	**I.**			Pomology 50,	3	Pomology 75,	3
Agronomy,	77 **II.**	5				Rural Engineering 76,	5	Pomology 77,	5
Rural Engineering,	76 **I.**	5						Pomology 80,	1
Farm Management,	75 **II.**	3						Agronomy 75,	5
Pomology,	50 **I.**	3	**II.**			Pomology 51,	3	Pomology 76,	3
						Farm Management 75,	3	Pomology 81,	1
								Agronomy 77,	5
Pomology,	51 **II.**	3	**III.**	Horticulture 27,	3	Pomology 52,	3	Pomology 78,	3
Pomology,	52 **III.**	3						Pomology 82,	1
Pomology,	75 **I.**	3							
Pomology,	76 **II.**	3	**IV.**			Pomology 53,	5		
Pomology,	77 **I.**	5							
Pomology,	78 **III.**	3							
Pomology,	80 **I.**	1							
Pomology,	81 **II.**	1							
Pomology,	82 **III.**	1							
		44							

Sophomore Elective Prerequisites (Required). — Horticulture 27.

Advised. — Rural Engineering 26, Entomology 26 and 27.

Additional Information. — The rest of the sophomore electives allowed are left to the student to choose.

Economic Botany. (Major.)

Professor A. Vincent Osmun, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	52 **I.**	3	**I.**	Chemistry 25,	3	Botany 52,	3	Botany 75,	5
Botany,	53 **II.**	3		German 25 or 28,	3	Botany 55,	3	Botany 78,	5
Botany,	54 **III.**	3				Chemistry 51,	8	Botany 86,	1
Botany,	55 **I.**	3							
Botany,	56 **II.**	3							
Botany,	75 **I.**	5	**II.**	Chemistry 26,	3	Botany 53,	3	Botany 76,	5
Botany,	76 **II.**	5		German 26 or 29,	3	Botany 56,	3	Botany 79,	5
Botany,	77 **III.**	5		Botany 26,	3			Botany 82,	3
Botany,	78 **I.**	5						Botany 87,	1
Botany,	79 **II.**	5							
Botany,	80 **III.**	5							
Botany,	82 **II.**	3	**III.**	German 27 or 30,	3	Botany 54,	3	Botany 77,	5
Botany,	83 **III.**	3						Botany 80,	5
Botany,	86 **I.**	1						Botany 83,	3
Botany,	87 **II.**	1						Botany 88,	1
Botany,	88 **III.**	1							
Chemistry,	51 **I.**	8							
		62	**IV.**						

Sophomore Elective Prerequisites (Required). — German 25 or 28, 26 or 29, 27 or 30, Botany 26.

Advised. — Chemistry 25 and 26.

Additional Information. — The balance of the sophomore electives allowed are left to the student to choose. Selection of 45 credits of the above (Pathology 75, 76 and 77, Physiology 78, 79 and 80.)

Agricultural Chemistry. (Major.)

Professor Charles A. Peters, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry,	51 **I.**	8	**I.**	Chemistry 25,	3	Chemistry 51,	8	Chemistry 76,	5
Chemistry,	52 **II.**	8		German 25 or 28,	3	Chemistry 60,	3	Chemistry 80,	5
Chemistry,	60 **I.**	3							
Chemistry,	61 **II.**	3							
Chemistry,	62 **III.**	5							
Chemistry,	65 **III.**	5	**II.**	Chemistry 26,	3	Chemistry 52,	8	Chemistry 77,	3
Chemistry,	76 **I.**	5		German 26 or 29,	3	Chemistry 61,	3	Chemistry 90, 92, 94,	3[2]
Chemistry,	77 **II.**	3		Entomology 26,	3				
Chemistry,	80 **I.**	5							
Chemistry,	87 **III.**	3							
Chemistry,	90 **II.**	} 3[1]							
Chemistry,	92 **II.**								
Chemistry,	94 **II.**								
Chemistry,	91 **III.**	} 5	**III.**	Chemistry 27,	5	Chemistry 62,	5	Chemistry 91, 93, 95,	5
Chemistry,	93 **II.**			German 27 or 30,	3	Chemistry 65,	5	Chemistry 87,	3
Chemistry,	95 **III.**			Entomology 27,	2				
		54[2]							
			IV.						

Sophomore Elective Prerequisites (Required). — Chemistry 25, 26 and 27.

Advised. — German 25 or 28, 26 or 29, 27 or 30, Entomology 26 and 27.

Additional Information. — The balance of the sophomore electives allowed are left for the student to choose.

[1] Courses 90, 92, 94 may be changed from 3 credits to an option of 3 or 5 credits.

[2] To get the allowed 45 credits the student will select one of the following groups of courses: 90 and 91, or 92 and 93, or 94 and 95, together with the balance from courses shown above.

Economic Entomology. (Major.)

Professor Henry T. Fernald, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 **I.**	2	**I.**	French 25–28, or German 25–28,	3	Botany 50,	2	Entomology 76,	5
Botany,	51 **II.**	2				Zoölogy 50,	3		
Entomology,	50 **I.**	3				Entomology 50,	3		
Entomology,	51 **II.**	3		Chemistry 25,	3				
Entomology,	52 **III.**	3							
Entomology,	75 **III.**	4	**II.**	French 26–29, or German 26–29,	3	Zoölogy 51,	3	Entomology 77,	3
Entomology,	76 **I.**	5				Entomology 51,	3	Zoölogy 76,	3
Entomology,	77 **II.**	3				Botany 51,	2	Entomology 90,	3
				Entomology 26,	3	Chemistry 61,	3		
				Botany 26,	3				
Entomology,	78 **III.**	4	**III.**	French 27–30, or German 27–30,	3	Zoölogy 52,	3	Entomology 78,	4
Entomology,	90 **II.**	3				Entomology 55,	3	Entomology 75,	4
Zoölogy,	50 **I.**	3		Entomology 27,	2				
				Chemistry 27,	5				
Zoölogy,	51 **II.**	3	**IV.**						
Zoölogy,	52 **III.**	3							
Zoölogy,	54 **II.**	3							
		38							

Sophomore Elective Prerequisites (Required). — Entomology 26 and 27, Botany 26.

Advised. — French or German 25 or 28, 26 or 29, 27 or 30, Chemistry 25, 27 and 61.

Additional Information. — The balance of the sophomore electives allowed are left for the student to choose. Juniors are advised to take Entomology 60. In 1916-17 Entomology 26 and 27 will be taken by juniors as part of their major. Beginning 1917-18 the regular junior courses 50, 51 and 52 will be in operation.

Microbiology. (Major.)

Professor Charles E. Marshall, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry,	51 I.	8	I.	Chemistry 25,	3	Microbiology 50,	5	Microbiology 81,	5
Chemistry,	52 II.	8		German or French 25 or 28,	3	Microbiology 51,	5	Microbiology 82,	5
Microbiology,	50 I.					Chemistry 51,	8	Microbiology 83,	5
or		5							
Microbiology,	50 III.		II.	German or French 26 or 29,	3	Microbiology 51,	5	Microbiology 75,	5
Microbiology,	51 I.					Chemistry 52,	8	Microbiology 80,	5
or								Dairying 75,	5
Microbiology,	51 II.	5							
or									
Microbiology,	51 III.		III.	Chemistry 27,	5	Microbiology 50,	5	Microbiology 76,	5
Microbiology,	52 III.	5		German or French 27 or 30,	3	Microbiology 51,	5		
				Physics 27,	5	Microbiology 52,	5		
Microbiology,	81 I.								
or			IV.						
Microbiology,	82 I.	5							
or									
Microbiology,	83 I.								
Microbiology,	80 II.								
or									
Microbiology,	75 II.	5							
or									
Dairying,	75 I.								
		41							

Sophomore Elective (Recommendations). — German or French 25 or 28, 26 or 29, 27 or 30, Chemistry 25 and 27, and Physics 27.

Additional Information. — The rest of the sophomore electives allowed are left for the student to choose. Microbiology 51, fall term, will be taken by students who have had Microbiology 50 the preceding spring, and by those who are permitted to omit Microbiology 50.

Rural Journalism. (Major.)

Associate Professor Robert W. Neal, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore. Credit.	Junior. Credit.	Senior. Credit.
Rural Journalism,	50 **I.**	3	**I.**		Journalism 50, 3	Journalism 77, 3
Rural Journalism,	51 **II.**	3			[Journalism 53, 3]	Journalism 80, 4 (5)
					Agricultural Economics 51, 5	
Two out of three: —						
[Rural Journalism,	53 **I.**	3]	**II.**	Economics and Sociology 26, 5	Journalism 51, 3	Journalism 77, 3
Rural Journalism,	54 **II.**	3			Journalism 54, 3	Journalism 81, 4 (5)
Rural Journalism,	55 **III.**	3			Economics and Sociology 51, 5	
Two out of three: —						
Rural Journalism,	77 **I.**	3	**III.**		Journalism 55, 3	[Journalism 77, 3]
Rural Journalism,	78 **II.**	3				Journalism 82, 4 (5)
Rural Journalism,	79 **III.**	3				
All: —						
Rural Journalism,	80 **I.**	4 (5)				
Rural Journalism,	81 **II.**	4 (5)				
Rural Journalism,	82 **III.**	4 (5)				
Agricultural Economics,	51 **III.**	5	**IV.**			
Economics and Sociology,	51 **I.**	5				
Courses to be individually prescribed for remainder of 45 hours.		5				
		45				

Sophomore Prerequisites. — All sophomore English; Economics and Sociology 26. II.

Sophomore Recommendations. — French or German 25 (28), 26 (29), 27 (30); Drawing 25. *For agricultural journalism especially:* Animal Husbandry 25, 26, Chemistry 30, Entomology 26, 27.

Advised. — French or German at least two years in college; at least two courses in literature; Music; Landscape 75, 78; Chemistry 87; Entomology 90; Microbiology 50; (Veterinary 78); Zoölogy 27; Geology 27; Agricultural Education 50, 53; Rural Sociology 50, 52; other courses in Economics and Sociology, Rural Sociology, Agricultural Economics, History and Government. *Especially for agricultural journalism:* Agronomy 50, 51; Animal Husbandry 51; Dairying 77; Farm Management 75, 76; Poultry 50; Rural Engineering 75, 76; Horticulture 27, 75; Forestry 52; Market Gardening 50; Pomology 50; Mathematics (75), 77; Veterinary 78; other courses in the economics and the sociology departments bearing on rural problems.

Agricultural Economics. (Major.)

Professor Alexander E. Cance, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics,	50 **I.**	5	**I.**			Agricultural Economics 50,	5	Agricultural Economics 77,	5
Agricultural Economics,	52 **II.**	5				Economic Sociology 51,	5		
Agricultural Economics,	53 **III.**	5							
Agricultural Economics,	78 **III.**	3							
Agricultural Economics,	76 **II.**		**II.**			Agricultural Economics 52,	5	Agricultural Economics 76,	5
or		5				Rural Sociology 51,	3	Rural Sociology 78,	5
Agricultural Economics,	77 **I.**					Economic Sociology 50,	5		
Economic Sociology,	51 **I.**	5							
Economic Sociology,	50 **II.**	5	**III.**			Rural Sociology 52,	3	Farm Management 76,	5
Farm Management,	76 **III.**	5				Agricultural Economics 53,	5	Agricultural Economics 78,	3
Rural Sociology,	51 **II.**								
or		3							
Rural Sociology,	52 **III.**		**IV.**						
Rural Sociology,	78 **II.**	5							
		46							

Additional Information. — The sophomore electives are left to the student to choose.

Agricultural Education. (Major.)

Professor William R. Hart, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Education,	50 I.	5	I.			Botany 50,	2	Agronomy 75,	5
Agricultural Education,	51 II.	5				Agricultural Education 50,	5	Poultry 50,	3
Agricultural Education,	52 I.					Agronomy 50,	5	Dairying 77,	5
Agricultural Education,	52 II.					Pomology 50,	3	Agricultural Education 52,	5
Agricultural Education,	52 III.								
Agricultural Education,	52 IV.	5							
Agricultural Education,	53 III.	5	II.			Botany 51,	2	Farm Management 75,	3
Agronomy,	50 I.	5						Agricultural Education, 51,	5
Agronomy,	75 I.	5						Agricultural Education, 52,	5
Botany,	50 I.	2	III.			Market Gardening 50,	3	Agricultural Education, 52,	5
Botany,	51 II.	2				Agricultural Education 53,	5		
Dairying,	77 I.	5							
Farm Management,	75 II.	3	IV.					Agricultural Education 52,	5
Market Gardening,	50 III.	3							
Pomology,	50 I.	3							
Poultry Husbandry,	50 I.	3							
		51							

Additional Information. — The sophomore electives allowed are left to the student to choose.

Substitutions of other technical courses for some of those above mentioned may be made to meet the needs of individual students.

A selection is allowed of Poultry Husbandry 50 and Market Gardening 50, making 6 credits, or Agronomy 75, 5 credits, making the total credits 45 or 46.

Rural Sociology. (Major.)

Professor John Phelan, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics,	50 I.	5	I.			Agricultural Economics 50,	5	Rural Sociology 75,	3
Agricultural Economics,	52 II.	5				Rural Sociology 50,	3	Economics and Sociology 75,	5
Economics and Sociology,	51 II.	5							
Economics and Sociology,	75 I.	5							
Economic Sociology,	76 III.	5	II.			Rural Sociology 51,	3	Rural Sociology 77,	3
Rural Journalism,	55 III.	3				Agricultural Economics 52,	5	Rural Sociology 78,	5
						Agricultural Education 52,	5		
						Economic Sociology 51,	5		
Rural Sociology,	50 I.	3	III.			Rural Journalism 55,	3	Economic Sociology 76,	5
Rural Sociology,	52 III.	3				Rural Sociology 52,	3		
Rural Sociology,	51 II.	3							
Rural Sociology,	77 II.	3	IV.						
Rural Sociology,	75 I.	3							
Agricultural Education, or Rural Sociology,	52 II. 78 II.	5							
		48							

Additional Information. — The sophomore electives allowed are left to the student to choose.

Description of Courses.

THE
JOHN CREAR
LIBRARY

Description of Courses.

DIVISION OF AGRICULTURE.

Professor Foord.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agriculture and Horticulture. — Freshmen. This course continuing through the year constitutes the required elementary work dealing with the foundations of the subjects of live stock and the crops of the field, orchard and the garden. Several departments collaborate in giving the work; three credits each term are assigned to this course. For a description of the work, and for information as to distribution of credits, see the following: —

Agronomy 1, I., II., III.
Animal Husbandry 1, II.
Poultry Husbandry 1, I.
Horticulture 1, I., II., III.

Agronomy.

Associate Professor Beaumont, Assistant Professor Jones, Mr. Merkle, Mr. Purington, Mr. Gordon.

Required Course.

1. **I.** 2. **II.** 3. **III.** Agronomy. — Freshmen. Given as part of the freshman agriculture and horticulture. This course aims, by actual contact with the plants and the plant products, to make the students familiar with the common field, garden and orchard crops of Massachusetts.

1. 2 2-hour laboratory periods. Credit, 2.
2. 1 2-hour laboratory period. Credit, 1.
3. 2 2-hour laboratory periods. Credit, 2.

Assistant Professor Jones and Mr. Merkle.

Elective Courses.

29. **II.** Soil Fertility. — For unclassified students. A study of soils and their properties, manure, fertilizers and soil amendments. The principles and factors of soil management are considered together with economical and practical means of improving and maintaining soil fertility.

3 class hours. 1 2-hour laboratory period, credit, 4.

Associate Professor Beaumont and the Department.

50. **I.** Field and Forage Crops. — For juniors; seniors may elect. History, classification and production of corn and of those grasses, legumes, root and tuber crops suited to New England conditions. Crops of less im-

portance in New England are briefly considered. The work includes lecture, laboratory and field study.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor JONES and the DEPARTMENT.
Prerequisites, Agronomy 27, Botany 3.

51. **III.** ADVANCED FIELD CROPS. For juniors; seniors may elect. Study of the cereals and other field crops not taken up or only briefly considered in Course 50. General problems of crop production are also considered, and the work is not entirely confined to New England conditions. The laboratory work includes a study of the cereals, the quality of seeds, grains and crop products, crop problems and field work with such crops as are available.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor JONES and the DEPARTMENT.
Prerequisite, Agronomy 50.

75. **I.** ADVANCED SOILS. — For seniors; juniors may elect. A field, lecture and laboratory course on soils and their adaptability to different uses. The field work consists of a detailed study of soil textures, natural and spontaneous vegetation and other factors which indicate the fertility and adaptation of the soil; accompanied by a laboratory study of the physical properties of the soils sampled.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Associate Professor BEAUMONT and Mr. MERKLE.
Prerequisite, Agronomy 27.

76. **III.** DRAINAGE AND IRRIGATION. — For seniors; juniors may elect. A field and lecture course on soil improvement by drainage and irrigation, with special reference to problems of this nature as faced by Massachusetts farmers. Given in association with the department of Rural Engineering.
2 class hours. 1 2-hour and 1 4-hour laboratory period, credit, 5.
Associate Professor BEAUMONT and Mr. MERKLE.
Prerequisites, Mathematics 26 and 27, Agronomy 27.

77. **II.** MANURES AND FERTILIZERS. — Seniors. An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Considerable attention is devoted to consideration of the experimental work which has been done, and which is now in progress. The laboratory work consists of a study of fertilizers, fertilizer mixtures, limes and culture work.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Associate Professor BEAUMONT and Mr. MERKLE.
Prerequisite, Agronomy 27.

78. **II.** BREEDING OF FIELD CROPS. — Seniors. This course deals with the improvement, by selection and breeding, of the crops studied in Courses 50 and 51.
3 class hours.
Assistant Professor JONES.
Prerequisite, Agronomy 51.

Animal Husbandry.

Professor McNutt, Assistant Professor Pontius.

Required Course.

1. **II.** Animal Husbandry. — Freshmen. Given as part of the freshman agriculture and horticulture. This course acquaints the student with the foundations of the live-stock industry. In the lectures the types and market classes of farm animals, and their uses, are considered; in the laboratory period elementary judging practice familiarizes the student with animals of the various types.

1 class hour. 1 2-hour laboratory period, credit, 2.
Professor McNutt.

Elective Courses.

25. **I.** Breeds and Types of Live Stock. — Sophomores. A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Textbook, Plumb's "Breeds and Types of Farm Animals."

2 lectures. 1 2-hour laboratory period, credit, 3.
Assistant Professor Pontius.

26. **II.** Breeds and Types of Live Stock. — Sophomores. Continuation of Course 25.

2 lectures. 1 2-hour laboratory period, credit, 3.
Assistant Professor Pontius.

Prerequisite, Animal Husbandry 25.

50. **II.** Live Stock Management. — For juniors; seniors may elect. The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, harnessing, casting and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work.

1 lecture. 2 2-hour laboratory period, credit, 3.
Professor McNutt.

Prerequisites, Animal Husbandry 25 and 26.

51. **III.** Principles of Breeding. — For juniors; seniors may elect. This course is designed to familiarize the student with the problems that are involved in animal improvement; to acquaint him with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; DeVrie's theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live-stock improvement. "Genetics," by Herbert E. Walter. Supplementary reading.

3 class hours. Credit, 3.
Assistant Professor Pontius.

Prerequisite, Zoölogy 25.

52. **III.** Advanced Stock Judging. — For juniors; seniors may elect. This course is designed to equip animal husbandry students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits will be made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected from this class.

1 2-hour and 1 4-hour laboratory period, credit, 3.
Professor McNutt.

Prerequisite, Animal Husbandry 50.

75. **I.** Feeding and Management. — For seniors; juniors may elect. A study of the principles of animal nutrition; of the composition and qualities of feeding materials. Textbook, Henry's "Feeds and Feeding."

3 class hours. Credit, 3.
Assistant Professor Pontius.

Prerequisite, Chemistry 30 or 51.

76. **II.** Feeding and Management. — For seniors; juniors may elect. A study of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production. Textbook, Henry's "Feeds and Feeding."

3 class hours. Credit, 3.
Assistant Professor Pontius.

Prerequisite, Chemistry 30 or 51.

77. **III.** Feeding and Management. — For seniors; juniors may elect. A continuation of Courses 75 and 76, dealing in a similar manner with horses, sheep, beef cattle and swine.

3 class hours. Credit, 3.
Assistant Professor Pontius.

Prerequisite, Animal Husbandry 75.

78. **II.** Herd and Stud-book Study. — For seniors; juniors may elect. An advanced course in the study of the breeds of live stock, familiarizing the student with the detailed history of the breed, the most productive sires and dams of the various breeds, and the successful lines and methods of breeding.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor McNutt.

Prerequisite, Animal Husbandry 75.

80. **III.** Seminar. — For seniors majoring in animal husbandry only. Advanced study upon questions pertaining to live stock and live-stock production. Each student electing this work will choose some particular line of work in which he is specially interested, and will pursue study in this subject by reading, compilation and research. There will be no regular lecture period, but seminars will be held. A satisfactory report of the results must be presented in a thesis.

1 2-hour laboratory period, credit, 1.
Professor McNutt.

Dairying.

Professor Lockwood, Assistant Professor Jamison, Mr. Van Horn, Mr. Drain.

Elective Courses.

50. **I.** Milk and Milk Composition. — For juniors; seniors may elect. The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Assistant Professor Jamison and the Department.

51. **III.** Butter Making. — For juniors; seniors may elect. A study of separators and cream separation; handling milk and cream for butter making; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof.

2 class hours. 2 3-hour laboratory periods, credit, 5.

Assistant Professor Jamison and Mr. Van Horn.

Prerequisite, Dairying 50.

75. **II.** Market Milk. — For seniors; juniors may elect. A study of market-milk conditions; extent and development of the business; supply and delivery; food value of milk and its uses as food; milk and its relation to the public health; proper methods for handling milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Professor Lockwood and the Department.

Prerequisite, Dairying 50.

76. **III.** Milk Products. — For seniors; juniors may elect. The manufacture of milk products other than butter, including cheddar cheese, soft and fancy cheese, ice cream, condensed milk, casein, milk powder, etc. Laboratories, largely the making of soft and fancy cheese and ice cream.

2 class hours. 2 3-hour laboratory periods, credit, 5.

Mr. Drain.

Prerequisite, Dairying 75.

77. **I.** Dairying. — For seniors; juniors may elect. A general course designed primarily for students who wish to take only one course in dairying. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary butter making; proper methods of handling milk and cream; and the relation of market milk to the public health.

3 lecture hours. 2 2-hour laboratory periods, credit, 5.

Mr. Drain and the Department.

Farm Management.

Professor Foord, Mr. Peacock.

Elective Courses.

75. **II.** Farm Cost Accounting. — For seniors; juniors may elect. A study of farm inventories, single-enterprise accounts, complete farm accounts, and farm records. Special emphasis is given to the interpretation of results and their application in the organization and management of the farm.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Foord and Mr. Peacock.

76. **III.** Farm Management. — For seniors; juniors may elect. The student should have had considerable farm experience before taking this course. Discussion and study of farming as a business; size, diversity and production and their influence on the farmer's labor income; relation of live stock to profits; regions and types of farming; cropping systems; efficient arrangement of fields and buildings; efficient use of labor, horses and machinery; marketing; methods of renting land; ways of starting farming; proper diversion of capital invested in land, buildings, stock, machinery and supplies; choosing and buying a farm, and organization and management of specific farms in the State.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Professor Foord and Mr. Peacock.

Prerequisites, Agronomy 50, Animal Husbandry 25 and 26.

Poultry Husbandry.

Professor Graham, Dr. Goodale, Assistant Professor Payne, Mr. Stewart.

Required Course.

1. **I.** Poultry Husbandry. — Freshmen. Given as part of the freshman agriculture and horticulture. The object of this course is to familiarize the student in a general way with the fundamental principles of poultry husbandry, — types of poultry houses, appliances, feeds and market products.

1 2-hour laboratory period, credit, 1.

Mr. Stewart.

Elective Courses.

50. **I.** Elements of Poultry Culture. — For juniors; seniors may elect. This course consists of a comprehensive study of opportunities in poultry culture, poultry-house construction, poultry-house equipment, feeds and feeding, winter-egg production, types and breeds of poultry.

3 class hours. Credit, 3.

Professor Graham, Assistant Professor Payne and Mr. Stewart.

51. **I.** Poultry Practice Work. — For juniors; seniors may elect. This is a practical laboratory course providing a study of external parasites, insecticides, poultry carpentry, caponizing, killing and picking; dressing and packing poultry.

2 2-hour laboratory periods, credit, 2.

Assistant Professor Payne.

Prerequisite, must be accompanied by Poultry 50.

52. **II.** Elements of Poultry Culture. — For juniors; seniors may elect. This course treats the subjects of incubation, brooding, care of growing stock, breeding for egg-production and diseases of poultry.
3 class hours. Credit, 3.
Assistant Professor Payne and Mr. Stewart.
Prerequisite, Poultry 50.

53. **III.** Incubation and Brooding. — For juniors; seniors may elect. In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg and the care of sitting hens. Laboratory time by arrangement.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Assistant Professor Payne.
Prerequisite, Poultry 52.

54. **III.** Pen Management. — For juniors; seniors may elect. This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls and profit and loss.
1 2-hour laboratory period, credit, 1.
Assistant Professor Payne and Mr. Cockell.
Prerequisite, Poultry 50.

55. **I., II. and III.** Investigational Work. — Seniors. This course is designed especially for students who are planning to do experiment station work. Students will be assigned specific problems to work out experimentally, or they may be required to assist in carrying on such work.
1 to 5 2-hour laboratory periods, credits, 1 to 5.
Dr. Goodale.

75. **II.** Poultry Management. — Seniors. A detailed study of large poultry farms and their equipment, such as bone cutters, feed cutters, cramming machines, etc.; the laying out and planning of poultry buildings of all kinds; mating of fowls. Attention to poultry diseases and investigation work carried on by experiment station is prominent. A few good poultry plants will be visited by the class for practical demonstrations.
5 class hours. Credit, 5.
Professor Graham.
Prerequisites, Poultry 53, 54, 76 and 77.

76. **I.** Advanced Poultry Judging. — Seniors. This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The laboratory work covers score card and comparative judging of exhibition and utility poultry; conditioning show birds, and applying the latest methods of selecting high and low producing hens. A few of the best Connecticut Valley poultry shows will be visited by the class. The American Standard of Perfection will be used as a text.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Mr. Stewart.
Prerequisite, Poultry 53.

77. **I.** Market Poultry and Poultry Products. — Seniors. This course includes the study of market classifications of poultry, eggs and feathers,

the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Preserving eggs, judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor PAYNE.

Prerequisites, Poultry 50, 51 and 52.

Rural Engineering.

Professor GUNNESS.

Elective Courses.

25. **I.** CARPENTRY. — For sophomores; juniors and seniors may elect. Practice in the use of tools by exercises in bench work, repair of farm equipment and farm building construction.

2 2-hour laboratory periods, credit, 2.
RURAL ENGINEERING DEPARTMENT.

26. **II.** REPAIR OF FARM EQUIPMENT. — For sophomores; juniors and seniors may elect. Exercises in forge work, pipe fitting, soldering. Practice in the use of machinists' tools, such as file, cold chisel, drill press, taps and dies.

2 2-hour laboratory periods, credit, 2.
RURAL ENGINEERING DEPARTMENT.

75. **I.** FARM STRUCTURES. — For seniors; juniors may elect. Study of the strength, durability and cost of building materials; water supply; lighting and heating systems for the farm; drawing plans, writing specifications and estimating the cost of buildings; concrete construction as applied to foundations, silos, tanks, posts, floors and walks.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor GUNNESS.

76. **I.** FARM MECHANICS. — For seniors; juniors may elect. A general study of the farm equipment; farm buildings, their location, plan and arrangement; water supply; sewage disposal; lighting and heating systems; farm power and farm machinery. Course 76 has been planned for the benefit of those students who want a general course in farm mechanics but cannot spend the time to take the two courses 75 and 78.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor GUNNESS.

77. **II.** POWER MACHINERY. — For seniors; juniors may elect. Steam and gasoline engines, refrigerating machinery, electric motors and dynamos. Practice in pipe fitting, soldering, babbitting and fitting bearings, lacing belts and packing valves. Course 77 is intended primarily for dairy students, but would be valuable to any man who would expect to use engines, pumps or electrical machinery.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor GUNNESS.

78. **III.** Farm Machinery. — For seniors; juniors may elect. Study of the care and operation of tillage, seeding, harvesting, pumping and spraying machinery; steam and gas engines. Special attention will be given to the use of power on the small farm. Practice in the adjustment of the various machines, babbitting and fitting bearings, lining shafts and pulleys, lacing belts, and splicing rope.

2 class hours. 3 2-hour laboratory periods, credit, 5.

Professor Gunness.

DIVISION OF HORTICULTURE.

Professor Waugh, Assistant Professor Thompson, Assistant Professor Wheeler.

[The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.]

Required Course.

1. **I.** 2. **II.** 3. **III.** Horticulture. — Freshmen. Given as part of the freshman agriculture and horticulture.

Assistant Professor Wheeler.

Elective Courses (General).

27. **III.** Nursery Practice. — For sophomores; juniors and seniors may elect. This course treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums.

2 class hours. 1 2-hour laboratory period, credit, 3.

Assistant Professor Thompson.

50. **I.** Plant Materials. — For juniors; seniors may elect. This course aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Assistant Professor Thompson.

Prerequisite, Horticulture 27.

51. **III.** Plant Materials. — For juniors; seniors may elect. A continuation of Course 50, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Assistant Professor Thompson.

Prerequisite, Horticulture 50.

75. **I.** Plant Breeding. — For seniors and graduate students. [Not given in 1917–18.] This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Prerequisite, open only to students well prepared in agricultural or horticultural subjects.

Floriculture.

Assistant Professor HECHT, Mr. WILDON.

Elective Courses.

50. **I.** GREENHOUSE MANAGEMENT. — For juniors; seniors may elect. This course is designed to familiarize students with the methods followed in the management of greenhouse crops. The students are instructed in the practical operations of watering, potting, fumigating, ventilating and in the methods of propagation of plants by seed and cuttings. They will also be expected to arrange their hours according to the needs of the work.

2 class hours. 1 4-hour laboratory period, credit, 4.

Assistant Professor HECHT and Mr. WILDON.

Prerequisite, Horticulture 27.

51. **II.** GREENHOUSE MANAGEMENT. — For juniors; seniors may elect. Continuation of Course 50.

2 class hours. 1 4-hour laboratory period, credit, 4.

Assistant Professor HECHT and Mr. WILDON.

Prerequisite, Floriculture 50.

52. **III.** GREENHOUSE MANAGEMENT. — For juniors; seniors may elect. A continuation of Courses 50 and 51.

2 class hours. 1 4-hour laboratory period, credit, 4.

Assistant Professor HECHT and Mr. WILDON.

Prerequisite, Floriculture 51.

53. **I.** GREENHOUSE CONSTRUCTION. — For juniors; seniors may elect. The location, arrangement, construction, cost, heating and ventilating of greenhouse structures; also the drawing of plans and drafting of specifications for commercial houses and private ranges. Such practical work as glazing, the construction of concrete benches and cold frames will be included in this course.

2 class hours. 1 2-hour laboratory period, credit, 3.

Assistant Professor HECHT and Mr. WILDON.

Prerequisite, should be taken with Floriculture 50.

54. **II.** GREENHOUSE CONSTRUCTION. — For juniors; seniors may elect. A continuation of Course 53.

2 class hours. 1 2-hour laboratory period.

Assistant Professor HECHT.

Prerequisite, Floriculture 53.

75. **I.** COMMERCIAL FLORICULTURE. — Seniors. A detailed study will be made of the methods of culture for greenhouse plants and cut flowers for wholesale and retail markets. The care and marketing of all florists' crops will also be considered. Assigned readings on these topics.

2 class hours. 1 2-hour laboratory period, credit, 3.

Assistant Professor HECHT.

Prerequisite, Floriculture 52.

76. **III.** Commercial Floriculture. — Seniors. As stated under Course 75.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht.
Prerequisites, Floriculture 75 and 80.

77. **II.** Conservatory Work and Decorative Plants. — Seniors. A study of the tropical and subtropical foliage and flowering plants used in conservatory work. Their arrangement and care will also be considered. Assigned readings.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht.
Prerequisite, Floriculture 75.

78. **III.** Garden Flowers and Bedding Plants. — Juniors and seniors. This course aims to make the student familiar with those annuals, herbaceous perennials, bulbs and bedding plants used in landscape work. Their propagation, culture and uses will be considered. Assigned readings and field trips.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht and Mr. Wildon.

79. **III.** Seminar. — For seniors majoring in floriculture only. Advanced study of subjects pertaining to commercial floriculture or private garden work. All students electing this work will be assigned a specific problem, and will pursue study in these problems by reading and research. No regular lectures will be given, but seminars will be conducted each week. A satisfactory report of the results must be presented.
2 to 6 laboratory hours. Not to exceed 3 credits.
Assistant Professor Hecht.

80. **II.** Commercial Floriculture. — Seniors. As stated under Course 75.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht and Mr. Wildon.
Prerequisite, Floriculture 75.

Forestry.

Professor Clark.

Elective Courses.

50. **I.** Dendrology. — For juniors; seniors may elect. During the first part of the term frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Lectures, recitations, laboratories or field work at option of instructor.
3 2-hour laboratory periods, credit, 3.
Professor Clark.

51. **II.** Wood Technology. — For juniors; seniors may elect. A study of the commercial woods found in the lumber markets, methods of identifica-

tion, uses, strength values, technical qualities, decay and methods of preservation.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Clark.

52. **III.** Principles of Forestry. — For juniors; seniors may elect. A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Not required of students who propose to major in forestry.

2 class hours. Credit, 2.
Professor Clark.

53. **III.** Silviculture. — For juniors; seniors may elect. Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting.

1 class hour. 1 4-hour laboratory period, credit, 3.
Professor Clark.

Prerequisite, Forestry 50.

54. **IV.** Arboriculture. — For juniors; seniors may elect. A course dealing with problems of shade tree propagation, protection and repair; the choice and grouping of species; shade tree laws. Assigned readings.

120 hours' field work, credit, 5.
Professor Clark.

75. **I.** Forest Mensuration. — For seniors; juniors may elect. Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating.

3 class hours. 72 hours' field work, credit, 5.
Professor Clark.

78. **III.** Seminar — Report. — Seniors. This may involve research, laboratory or field work in the investigation of some subject, together with a review of the literature relating to it and an original written report evidencing the results. Subject to be chosen in conference with Professor Clark.

6 laboratory hours, credit, 3.
Professor Clark.

Landscape Gardening.

Professor Waugh, Assistant Professor Harrison.

Elective Courses.

50. **I.** Elements of Landscape Gardening. — Juniors. Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Must be followed by Course 51.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.
Professor Waugh.

Prerequisites, Mathematics 25 and 26, Drawing 25, 26 and 27, Horticulture 27.

51. **II.** Elements of Landscape Gardening. — Juniors. As stated under Course 50.

3 3-hour laboratory periods, credit, 4.
Assistant Professor Harrison.

Prerequisite, Landscape Gardening 50.

52. **III.** General Design. — Juniors. Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports on individual problems. Must be followed by Course 53.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.
Assistant Professor Harrison.

Prerequisites, Landscape Gardening 50 and 51, and either plant materials (Horticulture 50 and 51) or advanced mathematics.

53. **IV.** (Summer.) General Design. — Juniors. As stated under Course 52.

120 laboratory hours, credit, 5.
Assistant Professor Harrison.

Prerequisite, Landscape Gardening 52.

75. **I.** Theory of Landscape Art. — For seniors and graduates. The general theory and applications of landscape study, including a brief history of the art.

3 class hours. Credit, 3.
Professor Waugh.

76. **II.** Civic Art. — Seniors. The principles and applications of modern civic art, including city planning, city improvement, village improvement and rural improvement, with special emphasis upon country planning. Must be followed by Course 77.

3 3-hour laboratory periods, credit, 4.
Professor Waugh.

Prerequisite, Landscape Gardening 53.

77. **III.** Civic Art. — Seniors. As stated under Course 76.

3 3-hour laboratory periods, credit, 4.
Professor Waugh.

Prerequisite, Landscape Gardening 76.

78. **III.** Architecture. — Alternating with Course 79; given in 1916–17. Juniors and seniors. The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing.

3 class hours. Credit, 3.
Assistant Professor Harrison.

79. **III.** Construction and Maintenance. — Alternating with Course 78; given in 1917–18. Juniors and seniors. Detailed instruction in methods

of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc.

3 class hours. Credit, 3.

Assistant Professor Harrison.

Market Gardening.

Professor Tompson, Assistant Professor Thomson.

Elective Courses.

50. **III.** Elements of Market Gardening. — Juniors; seniors may elect. A study of the business of commercial vegetable growing to acquaint the student with the fundamental considerations of the business and a knowledge of the market-garden crops. The study of the crops will consist of classroom, laboratory and field work, dealing with propagation, cultivation and marketing. Text and reference books.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Assistant Professor Thomson.

75. **I.** Elements of Market Gardening. — Seniors. A continuation of Market Gardening 50. A systematic study of types, varieties and strains of the leading vegetable crops, as well as a study of the problems of farm planning, irrigation, crop rotation, spraying, storage and methods of marketing and seed production. Text and reference books. Occasional seminars. Laboratory and field work.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Assistant Professor Thomson.

Prerequisite, Market Gardening 50.

76. **II.** Greenhouse Vegetable Growing. — Seniors. A study of the production of vegetables under glass as a business, briefly considering economic reasons for its development, progress in methods and management and the present status of the industry. A study of vegetable-forcing house construction, heating and greenhouse management, as applied to the leading greenhouse crops, lettuce, cucumbers and tomatoes, with proportionate time given to the crops of lesser importance. Text and reference books and periodicals. Greenhouse work in actual production and management is a part of this course, and the student must so arrange that he can give it adequate attention. Considerable seminar work.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Assistant Professor Thomson.

Prerequisite, Market Gardening 75.

Pomology.

Professor Sears, Associate Professor Chenoweth, Mr. Fagan.

Elective Courses.

50. **I.** Practical Pomology. — For juniors; seniors may elect. A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery

stock, pruning, culture of orchards, orchard fertilizers, cropping orchards, etc. Lectures, supplemented with text and reference books; field and laboratory exercises.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Sears.

Prerequisite, Horticulture 27.

51. **II.** Practical Pomology. — For juniors; seniors may elect. As stated under Course 50.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Sears.

Prerequisite, Pomology 50.

52. **III.** Practical Pomology. — For juniors; seniors may elect. As stated under Course 50.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Sears.

Prerequisite, Pomology 51.

53. **IV.** (Summer.) Small Fruits. — For juniors; seniors may elect. The growing, harvesting, marketing and storing of small fruits, including currants, gooseberries and grapes, together with thinning, spraying, picking and marketing of tree fruits at the college orchards and in private commercial orchards.

120 laboratory hours, credit, 5.

75. **I.** Systematic Pomology. — Seniors. A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Lectures, laboratory and field exercises.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Prerequisite, Pomology 52.

76. **II.** Systematic Pomology. — Seniors. As stated under Course 75.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Prerequisite, Pomology 75.

77. **I.** Commercial Pomology. — Seniors only, majoring in pomology. The picking, handling, storing and marketing of fruits, including a discussion of storage houses, fruit packages, methods of grading and packing, manufacturing, etc. Especial emphasis is placed upon laboratory and field work, where the student is given actual practice in the picking and packing of all the principal fruits, together with the manufacture of by-products.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Chenoweth.

Prerequisite, Pomology 52.

78. **III.** Spraying. — Seniors. A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small-fruit plantations.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Sears.

Prerequisite, Pomology 52.

79. **III.** General Pomology. — For seniors; juniors may elect. This course is planned to meet the needs of those students who cannot devote more than one term to the subject but who want a general knowledge of fruit growing. The work will consist of lectures and laboratory exercises on such topics as choosing the locations, kinds and varieties of fruits to grow, securing and setting the plants, care and cultivation, pruning, spraying, pests, harvesting and storing.

2 class hours. 1 2-hour laboratory period, credit, 3.

80. **I.** Seminar. — For seniors majoring in pomology. Advanced study of problems relating to the business of fruit growing. Each student will be assigned a major and a minor problem in lines of work in which he is particularly interested. He will pursue his studies both by reading and research, and the materials obtained will be worked into theses which will be presented to the seminar for discussion. Reports on minor problems will be taken up first. No lectures will be given, but seminar meetings will be held for one period each week.

Credit, 1.

Professor Sears and Associate Professor Chenoweth.

81. **II.** Seminar. — For seniors majoring in pomology. A continuation of Course 80. One seminar meeting each week.

Credit, 1.

Professor Sears and Associate Professor Chenoweth.

82. **III.** Seminar. — For seniors majoring in pomology. A continuation of Course 81. One seminar meeting each week.

Credit, 1.

Professor Sears and Associate Professor Chenoweth.

Drawing.

Mr. Pauley.

Elective Courses.

25. **I.** Free-hand Drawing. — For sophomores; juniors and seniors may elect. Lettering; free-hand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water-color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink.

3 2-hour laboratory periods, credit, 3.
Mr. Pauley.

26. **II.** Mechanical Drawing. — For sophomores; juniors and seniors may elect. Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry.

3 2-hour laboratory periods, credit, 3.
Mr. Pauley.

27. **III.** Mechanical Drawing. — For sophomores; juniors and seniors may elect. As stated under Course 26.

3 2-hour laboratory periods, credit, 3.
Mr. Pauley.

Prerequisite, Drawing 26.

DIVISION OF SCIENCE.

Botany.

Professor Osmun, Associate Professor Anderson, Assistant Professor Clark, Mr. McLaughlin, Mr. White.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Required Courses.

3. **III.** Morphology and Taxonomy of the Higher Plants (Phanerogamia). — Freshmen. Seeds and seedlings; types of leaves, stems, roots and flowers. Determination and naming of plants, using Gray's "New Manual of Botany." An herbarium of 75 species of plants is required of each student.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Osmun, Mr. McLaughlin and Mr. White.

25. **I.** Anatomy, Physiology and Ecology of the Higher Plants. — Sophomores. Structure, functions, metabolism and environmental relations of seed plants.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Osmun, Mr. McLaughlin and Mr. White.

Prerequisite, Botany 3.

Elective Courses.

26. **II.** Morphology and Taxonomy of the Lower Plants (Cryptogamia). — Sophomores. Systematic study of typical forms of bacteria, algae, fungi, lichens, mosses, ferns. (Courses 3, 25 and 26 constitute a general elementary course in botany, and are prerequisites of all subsequent work taken in the Department of Botany.)

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Osmun, Mr. McLaughlin and Mr. White.

Prerequisite, Botany 25.

50. **I.** Diseases of Crops. — For juniors; seniors may elect. Laboratory and recitations devoted to diseases of the special crops related to the student's major. Arranged in sections for students specializing in (1) agronomy or market gardening; (2) floriculture or landscape gardening; (3) pomology; (4) general; (5) forestry. Students may take the laboratory work in one, two or three sections. The laboratory work for students in entomology is general, and includes the more important diseases studied in the other sections. The class is not sectioned for lectures, which are general.

1 class hour. 1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.

Associate Professor Anderson and Mr. McLaughlin.

Prerequisite, Botany 26.

51. **II.** Diseases of Crops. — For juniors; seniors may elect. As stated under Course 50.

1 class hour. 1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.

Associate Professor Anderson and Mr. McLaughlin.

Prerequisite, Botany 50.

52. **I.** Systematic Mycology. — For juniors; seniors may elect. Morphology and development of typical species representing the orders and families of fungi; practice in identification, collection and preservation of fungi; study of systems of classification; collateral reading. A prerequisite of the senior course in plant pathology, but open to all.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Anderson.
Prerequisite, Botany 26.

53. **II.** Systematic Mycology. — For juniors; seniors may elect. As stated under Course 52.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Anderson.
Prerequisite, Botany 52.

54. **III.** Systematic Mycology. — For juniors; seniors may elect. As stated under Course 52.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Anderson.
Prerequisite, Botany 53.

55. **I.** Plant Histology. — For juniors; seniors may elect. Comparative study of the tissues of plants; training in histological methods, including the use of precision microtomes, methods of killing, fixing, sectioning, staining and mounting; collateral reading and conferences. This course offers valuable training in preparation for further work in botany.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun and Mr. McLaughlin.
Prerequisite, Botany 26.

56. **II.** Plant Histology. — For juniors; seniors may elect. As stated under Course 55.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun and Mr. McLaughlin.
Prerequisite, Botany 55.

75. **I.** Plant Pathology. — Seniors. Comprehensive study of diseases of plants; training in laboratory methods and technique, including culture work and artificial inoculation of hosts; miscellaneous diagnosis; study of literature and representative life histories of pathogens. Prepares for civil service, experiment station and college work.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor Osmun and Associate Professor Anderson.
Prerequisite, Botany 54.

76. **II.** Plant Pathology. — Seniors. As stated under Course 75.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor Osmun and Associate Professor Anderson.
Prerequisite, Botany 75.

77. **III.** Plant Pathology. — Seniors. As stated under Course 75.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor Osmun and Associate Professor Anderson.
Prerequisite, Botany 76.

78. **I.** Plant Physiology. — Seniors. A general course dealing with such topics as absorption, nutrition, growth and movements of plants; training in laboratory methods and the use of apparatus; collateral reading.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Clark.
Prerequisites, Botany 26 and Chemistry 51.

79. **II.** Plant Physiology. — Seniors. As stated under Course 78.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Clark.
Prerequisite, Botany 78.

80. **III.** Plant Physiology. — Seniors. As stated under Course 78.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Clark.
Prerequisite, Botany 79.

82. **II.** Cytology and Embryology. — Seniors. Morphology and physiology of the cell; cell-division; embryonal development.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Mr. McLaughlin.
Prerequisites, Botany 26 and 55.

83. **III.** Cytology and Embryology. — Seniors. As stated under Course 82.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Mr. McLaughlin.
Prerequisite, Botany 82.

86. **I.** Seminar. — For seniors and graduate students. Presentation and discussion of important current botanical papers. A major requirement.
1 class hour. Credit, 1.
The Department.

87. **II.** Seminar. — For seniors and graduate students. As stated under Course 86.
1 class hour. Credit, 1.
The Department.

88. **III.** Seminar. — For seniors and graduate students. As stated under Course 86.
1 class hour or 2 laboratory hours. Credit, 1.
The Department.

General and Agricultural Chemistry.

Professor Lindsey, Professor Wellington, Professor Chamberlain, Professor Peters, Professor Anderson,[1] Mr. Serex, Mr. MacNeil.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and intending to follow chemistry as a vocation are prepared for positions as instructors in high schools and colleges, in the agricultural experiment stations, the United States Department of Agriculture, as well as in fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take especially graduate work leading to the degree of Master of Science, and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.]

Required Courses.

1. **I.** General Chemistry. — Freshmen. An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." This course is for those students who do not present chemistry for entrance, and who begin the subject in college.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Peters, Mr. Serex and Mr. Julian.

2. **II.** General Chemistry. — Freshmen. A continuation of Course 1. A study of metals and their compounds. The laboratory work is the same as described under Course 4.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Peters and Assistants.

3. **III.** Inorganic Agricultural Chemistry. — Freshmen. As stated under Course 5 **II.**
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Peters and Assistants.

4. **I.** Advanced General Chemistry. — Freshmen. A review of the fundamental chemical laws, together with the common acid and base-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate, superphosphate, muriate and sulfate of potash, arsenate of lead, Paris green, Bordeaux mixture, lime-sulfur and emulsions.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Peters and Assistants.
Prerequisite, Entrance Chemistry.

5. **II.** Inorganic Agricultural Chemistry. — Freshmen. A study of the chemical composition, properties and reactions of soils, fertilizers, fungi-

[1] On leave 1917–19.

cides and insecticides. The laboratory work is divided into three parts, as follows: (*a*) qualitative examination of soil, plant ash and superphosphate; (*b*) approximate quantitative determination of moisture, ash, carbonic acid, phosphoric acid, potash, etc.; (*c*) special work on retention of salts by soil, leaching of lime from the soil by carbonated water, etc.

2 class hours. 1 2-hour laboratory period, credit, 3.

Professor Chamberlain and Assistants.

6. **III.** Organic Agricultural Chemistry. — Freshmen. The course embraces the study of the most important groups of organic compounds of plants and animals, the composition of plants, the chemistry of plant growth, plants as food and as industrial material, the composition of animals, the chemistry of digestion, also the study of some of the products related to plants and animals, such as milk, butter, cheese, sugar and alcohol. The treatment of the subject will be general, avoiding (so far as possible) complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the general chemistry of plants and animals and agricultural processes and products.

2 class hours. 1 2-hour laboratory period, credit, 3.

Professor Chamberlain and Assistants.

Elective Courses.

7. **I.** Elementary Agricultural Chemistry. — Unclassified. This is a special course for unclassified students endeavoring to give in one term the essential facts and ideas of general chemistry and the chemistry of soils and fertilizers so that the student may be able to take up similar special courses in agronomy. The course will consist of a brief study of important elements and compounds, followed by a special study of the chemistry of soils and fertilizers. Textbook, Tottingham & Ince, "Chemistry of the Farm and Home." This will be supplemented by laboratory notes.

4 class hours. 1 2-hour laboratory period, credit, 5.

Professor Chamberlain.

25. **I.** Qualitative Analysis. — *Basic.* — Sophomores. A course in the systematic analysis of metallic salts, presented from the ionic viewpoint. The student studies closely the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Böttger's "Qualitative Analysis" and Treadwell-Hall's "Qualitative Analysis" for reference. This course should be taken, particularly, by all intending to follow chemistry as a vocation.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Mr. Serex.

Prerequisite, Chemistry 3 or 6.

26. **II.** Qualitative Analysis. — *Acidic.* — Sophomores. A continuation of Course 25.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Mr. Serex.

27. **III.** Quantitative Analysis. — For sophomores; juniors and seniors may elect. Instruction in this course includes the gravimetric and volu-

metric determinations of some of the commoner metals and non-metals. Talbot's "Quantitative Chemical Analysis" is used as a text.

1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor WELLINGTON and Professor PETERS.

Prerequisite, Chemistry 25. Course 26 is prerequisite for those majoring in chemistry.

30. **III.** ORGANIC AGRICULTURAL CHEMISTRY. —For sophomores; juniors and seniors may elect. As stated in Course 6.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor CHAMBERLAIN.

51. **I.** ORGANIC CHEMISTRY. — For juniors; seniors may elect. This course consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates and proteins. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and is especially planned for those majoring in chemistry or the other sciences. Those electing Course 51 are expected to elect Course 52.

5 class hours. 2 3-hour laboratory periods, credit, 8.
Professor CHAMBERLAIN.

Prerequisites, Chemistry 3 or 6, and Chemistry 27 for those majoring in chemistry.

52. **II.** ORGANIC CHEMISTRY. — For juniors; seniors may elect. As stated under Course 51.

5 class hours. 2 3-hour laboratory periods, credit, 8.
Professor CHAMBERLAIN.

60. **I.** ADVANCED QUANTITATIVE CHEMISTRY. — For juniors; seniors may elect. Advanced work on subjects as stated under Course 27.

1 class hour. 1 4-hour laboratory period, credit, 3.
Professor WELLINGTON and Professor PETERS.

Prerequisite, Chemistry 27.

61. **II.** INSECTICIDE ANALYSIS. — For juniors; seniors may elect. A study of methods for the analysis of insecticides.

1 class hour. 1 4-hour laboratory period, credit, 3.
Professor WELLINGTON and Professor PETERS.

Prerequisite, Chemistry 27.

62. **III.** SOIL AND FERTILIZER ANALYSES. — For juniors; seniors may elect. A study of methods for analyses of soils and fertilizers.

1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor WELLINGTON and Professor PETERS.

Prerequisite, Chemistry 27.

65. **III.** Physical Chemistry. — For juniors; seniors may elect. A résumé of general chemistry from the viewpoint of physical chemistry, and the application of physical chemistry to agricultural chemistry.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Mr. Serex.

Prerequisite, Chemistry 27.

76. **I.** Milk and Butter Analysis. — For seniors; juniors may elect. A study of chemical methods of analysis of milk and butter.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor Peters.

Prerequisite, Chemistry 27.

77. **II.** Cattle Feed, Water and Miscellaneous Analysis. — For seniors; juniors may elect. A study of methods of analysis of cattle feeds and water, with interpretations. Other materials may be analyzed.
1 class hour. 1 4-hour laboratory period, credit, 3.
Professor Peters.

Prerequisite, Chemistry 27.

80. **I.** Physiological Chemistry. — Seniors. This course is intended to be supplementary to Courses 51 and 52. To those who expect to take up scientific work in microbiology, botany, agronomy, animal husbandry, etc., and who have had Courses 51 and 52, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 51 and 52 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Chamberlain.

87. **III.** History of Chemistry. — Seniors. An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at greater length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course.
3 class hours. Credit, 3.
Professor Wellington.

90. **II.** Special Work in Agricultural Chemical Analysis. — Seniors. The student is given a problem to solve either in analytical chemistry or related to the agricultural industries. This is to acquaint him with the methods used in research and with the literature, and show him how to handle problems in this field of chemistry when occasion arises.
6 or 10 laboratory hours, credit, 3 or 5.
Professor Peters.

91. **III.** Special Work in Agricultural Chemical Analysis. — Seniors. As stated in Course 90.

10 laboratory hours, credit, 5.
Professor Peters.

Prerequisite, Chemistry 90.

92. **II.** Special Work in Physiological and Organic Agricultural Chemistry. — Seniors. In this course, as in Courses 90 to 95, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, the chemical study of dairy products, etc.

6 or 10 laboratory hours, credit, 3 or 5.
Professor Chamberlain.

Prerequisites, Chemistry 51, 52 and 80.

93. **III.** Special Work in Physiological and Organic Agricultural Chemistry. — Seniors. As stated under Course 92.

10 laboratory hours, credit, 5.
Professor Chamberlain.

Prerequisite, Chemistry 92.

94. **II.** Special Work in Physical Chemistry. — Seniors. The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student will select one line of work and follow it through the course, repeating some of the original work.

6 or 10 laboratory hours, credit, 3 or 5.
Mr. Serex.

Prerequisite, Chemistry 65.

95. **III.** Special Work in Physical Chemistry. — Seniors. As stated under Course 94.

10 laboratory hours, credit, 5.
Mr. Serex.

Prerequisite, Chemistry 94.

Entomology.

Professor Fernald, Professor Crampton, Associate Professor Gates, Dr. Regan.

Elective Courses.

26. **II.** 27. **III.** General and Economic Entomology. — For sophomores; juniors and seniors may elect. This is a general course in the study of insects intended for students in any line of work, and is directly continuous through two terms. It touches upon the structure of insects so far as this is needed for such a course; deals with metamorphosis, classification to the larger groups, and discusses the most important methods and materials used for control. The greater part of the time is devoted to special study of the

most important insect pests, particularly of New England, showing their modes of life, the injuries they cause, and the best methods of control. In this way the most serious pests of fruit trees, ornamental trees and shrubs, market-garden and greenhouse pests, those attacking field crops and those affecting animals and man, are treated. During the winter term and in the spring term until about the first of May instruction is given by lectures and recitations; from about the first of May field work takes the place of the lectures. In this part of the course the students are shown how to find and recognize the work of the various insect pests which may be accessible at that season of the year, and they also make and preserve a collection of insects.
3 class hours. Credit, 3.
Professor Fernald.

27. **III.** General and Economic Entomology. — As stated under Course 26. **II.**
2 class hours till about May 1; thereafter 2 2-hour field periods. Credit, 2.
Professor Fernald, Professor Crampton and Dr. Regan.

50. **I.** Pests of Special Crops. — For juniors; seniors may elect. For students not majoring in entomology. The laboratory work is largely individual in this term. Accordingly, students majoring in subjects other than entomology, but who desire a more complete knowledge of the insects connected with their own major line of work, can obtain it here. A student majoring in floriculture, for example, will devote his laboratory time to a careful study of the insects injuring floricultural crops, learning how to recognize them and their work in their different stages, and the best methods for their control. Courses of this kind are available on the insects attacking field crops, market-garden crops, tree fruits, small fruits, shade trees and shrubs, flowers, forest trees, the domesticated animals and man. This work may be continued in the winter term also. (See 51, **II.**)

51. **II.** Pests of Special Crops. — As stated in 50, **I.**

53. **I.** Insect Morphology. — For juniors; seniors may elect. For students majoring in entomology. The lectures of this course treat of the external and internal anatomy of insects, particularly of those characters used in identification, a knowledge of which is needed in the accompanying laboratory work. In the laboratory the external anatomy of the most important groups is studied, followed by the identification of insects of these groups, to show how the characters are made use of in learning the names of insects, and to teach the use of analytical keys.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Crampton, Professor Fernald and Dr. Regan.
Prerequisites, Entomology 26 and 27.

54. **II.** Insect Classification. — For juniors; seniors may elect. For students majoring in entomology. Systematic identification of insects of various groups. Study of various entomological publications and methods of finding the literature on any insect.
3 2-hour laboratory periods, credit, 3.
Professor Fernald, Professor Crampton and Dr. Regan.
Prerequisite, Entomology 53, **I.**

55. **III.** Economic Entomology. — For juniors; seniors may elect. Special studies on the most serious insect pests, their habits, nature of the injuries they cause and methods of control. In the lectures the composition, preparation and methods of application of the more important insecticides, their merits and defects, and studies of insecticide apparatus and other methods of control are treated. A portion of the laboratory time will be used in practical work on the topics taken up in the lectures.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Fernald, Professor Crampton and Dr. Regan.

Prerequisite, Entomology 51.

60. **III.** Beekeeping. — Juniors; seniors may elect. This course comprises a general consideration of the biology of the honey bee and the elements of practical beekeeping. Some topics covered are: life history, general behavior and instincts, structure, products, relations of bees to plants, the honey flora. The course aims particularly to afford first-hand, practical experience with bees, to the end of enabling their proper maintenance for any purpose, horticultural, educational or apicultural. Bee diseases, a thorough understanding of which is fundamental, are emphasized. So far as possible, the work is made individual in constructing materials and apparatus and in the manipulation of bees.

3 lecture hours. 2 2-hour laboratory periods, credit, 5.

Associate Professor Gates.

75. **III.** Forest and Shade-tree Insects. — For seniors; juniors may elect. A study of the insects injurious to forest and shade trees, and of methods for their control, with laboratory and field work on these insects, together with investigation of what is known about them.

1 class hour. 3 2-hour laboratory or field periods, credit, 4.

Dr. Regan.

Prerequisites, Entomology 26 and 27; 53, **I.**, desirable.

76. **I.** Advanced Entomology. — For seniors. During this year studies of scale insects (coccidology), life histories of important pests, the preparation of bibliographies, methods of rearing, photography of insects, methods for experimental work and record keeping, and studies of the early stages of insects will be given. Insects as disease carriers, insect bionomics, and a study of the animals not insects with which entomologists are expected to deal, will also be included in this course.

2 class hours. 3 2-hour laboratory periods, credit, 5.

Professor Fernald, Professor Crampton and Dr. Regan.

Prerequisite, Entomology 55.

77. **II.** Advanced Entomology. — As stated in Course 76, **I.**

3 2-hour laboratory periods, credit, 3.

Professor Fernald, Professor Crampton and Dr. Regan.

Prerequisite, Entomology 76.

78. **III.** Advanced Entomology. — As stated in Course 76, **I.**

1 class hour. 3 2-hour laboratory or field periods, credit, 4.

Professor Fernald, Professor Crampton and Dr. Regan.

Prerequisite, Entomology 77.

80. **III.** Advanced Beekeeping. — Seniors; juniors may elect. This course deals with the advanced and special problems of the beekeeper. Besides considering those difficulties which at present confront the industry, subjects necessarily of limited treatment in the previous course are expanded for the development of particular technique and manipulation. Apiary management, including the principles of queen rearing, is practiced. The course should further qualify for apicultural instruction and inspection service, affording familiarity with the special literature and methods needed in investigation and research. The policy of individual instruction is continued in so far as practicable.

2 lecture hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Gates.

Prerequisite, Course 60.

90. **II.** Evolution. — For juniors; seniors may elect. In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the developmental history of man, and of the races of mankind, the evolution of human intelligence, languages, culture, institutions, etc., and man's probable future in the light of his past development. Especial consideration is given to the factors of evolution, the basic principles of heredity, sex-determination, variation and similar topics, with particular reference to their application to human welfare; and the recent contributions in the field of entomology to the advancement of our knowledge of these fundamental principles are briefly reviewed. The lectures are supplemented by collateral reading, and monthly seminars will be held for the purpose of demonstration and discussion by the class.

3 class hours. Credit, 3.
Professor Crampton.

Mathematics and Civil Engineering.

Professor Ostrander, Assistant Professor Duncan, Assistant Professor Machmer,[1] Mr. Hazeltine.[1]

Required Courses.

1. **I.** Higher Algebra. — Freshmen. A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Fite's "College Algebra."

5 class hours. Credit, 5.
The Department.

2. **II.** Higher Algebra. — As stated under Course 1.

2 class hours. Credit, 2.
The Department.

[1] Absent on leave.

3. **III.** Solid Geometry. — Freshmen. Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Required unless accepted for admission.
3 class hours. Credit, 3.
The Department.

5. **II.** Plane Trigonometry (in charge of Department of Physics). — Freshmen. The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry."
3 class hours. Credit, 3.
Professor Hasbrouck and Assistant Professor Robbins.

6. **III.** Mensuration and Computation. — Freshmen. The course includes a review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule. Also the graph, mensuration of plane and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of woodworking; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements.
2 class hours. Credit, 2.
The Department.

Elective Courses.

26. **II.** Plane Surveying. — For sophomores; juniors and seniors may elect. The elements of the subject, including the adjustment and use of the usual instruments. Textbook and lectures.
2 class hours. Credit, 2.
The Department.

27. **III.** Plane Surveying. — For sophomores; juniors and seniors may elect. As stated under Course 26. Includes field work.
3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisite, Mathematics 26.

50. **I.** Analytic Geometry. — For juniors; seniors may elect. A discussion of the geometry of the line, the circle of conic sections and of the higher plane curves. Fine and Thompson's "Co-ordinate Geometry."
3 class hours. Credit, 3.
The Department.

Prerequisites, Mathematics 1, 2, 3 and 5.

51. **II.** Differential and Integral Calculus. — For juniors; seniors may elect. A first course in the subject, with some of the more important applications. Davis's "Differential and Integral Calculus."
5 class hours. Credit, 5.
The Department.

Prerequisites, Mathematics 1, 2, 3 and 5.

52. **III.** Integral Calculus. — For juniors; seniors may elect. A continuation of Course 51.
5 class hours. Credit, 5.
The Department.

Prerequisite, Mathematics 51.

53. **II.** Elementary Structures. — For juniors; seniors may elect. An elementary course in roofs and bridges. Textbook and lectures.
3 class hours. 1 2-hour laboratory period, credit, 4.
The Department.

75. **I.** Hydraulics and Sanitary Engineering. — For seniors; juniors may elect. Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Textbook and lectures.
5 class hours. Credit, 5.
The Department.

76. **I.** Materials of Construction, Foundations and Masonry Construction. — For seniors; juniors may elect. Textbook and lectures.
4 class hours. 1 2-hour laboratory period, credit, 5.
The Department.

77. **II.** Roads and Railroads. — For seniors; juniors may elect. Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Textbook and lectures.
3 class hours. Credit, 3.
The Department.

78. **III.** Roads and Railroads. — For seniors; juniors may elect. As stated under Course 77.
3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisite, Mathematics 77.

79. **I.** Applied Mechanics. — Seniors. A course in applied mechanics, based on the calculus, with problems. Textbooks and lectures.
5 class hours. Credit, 5.
The Department.

Prerequisite, Mathematics 51, 52.

Microbiology.

Professor Marshall, Assistant Professor Itano, Mr. Hood, Mr. Neill.

[Courses 50 and 51 are especially adapted to those who wish a general comprehensive, although elementary, survey of agricultural microbiology.]

Elective Courses.

50. **I. and III.** Introduction and General Microbiology. — For juniors; seniors may elect. A review of the field of microbiology as a whole, with special reference to hygienic microbiology, will constitute this course. It will be taught by means of lectures, demonstrations and textbooks. Although desirable, it will not be required as a prerequisite to all courses that follow, and may be taken along with Course 51.

5 class hours. Credit, 5.

Professor Marshall and Mr. Hood.

51. **I., II. and III.** Morphological, Cultural and Physiological Microbiology. — For juniors; seniors may elect. Types of micro-organisms, technic of handling, methods of culture and functions of micro-organisms are considered. This course is elementary and fundamental to all applied and special microbiological studies, and therefore is made a prerequisite to all courses following. One hour will be scheduled.

10 laboratory hours, credit, 5.

Assistant Professor Itano and Mr. Neill.

52. **III.** Advanced Morphological, Cultural and Physiological Microbiology. — For juniors; seniors may elect. The purpose of this course is to prepare the student for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technic and methods of culture, together with a more extensive knowledge of micro-organisms and their functions. One hour will be scheduled.

10 laboratory hours, credit, 5.

Assistant Professor Itano and Mr. Neill.

Prerequisite, Microbiology 51.

75. **II.** Agricultural Microbiology. — For seniors; juniors may elect. This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor Marshall, Assistant Professor Itano and Mr. Neill or Mr. Hood.

Prerequisite, Microbiology 51.

76. **III.** Agricultural Microbiology. — For seniors; juniors may elect. As stated under Course 75. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor Marshall, Assistant Professor Itano and Mr. Neill or Mr. Hood.

Prerequisites, Microbiology 52 and 75.

80. **II.** Soil Microbiology. — For seniors; juniors may elect. Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention. One hour will be scheduled.

10 laboratory hours, credit, 5.

Assistant Professor Itano.

Prerequisite, Microbiology 51.

81. **I.** Hygienic Microbiology. — For seniors; juniors may elect. An attempt will be made to select for this course certain material which should be the possession of every individual, and which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antisepsis and asepsis, will be treated. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor Marshall and Mr. Hood, or Assistant Professor Itano and Mr. Neill.

Prerequisites, Microbiology 50 and 51.

82. **I.** Dairy Microbiology. — For seniors; juniors may elect. Special emphasis will be placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk; bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered.

10 laboratory hours, credit, 5.

Professor Marshall and Mr. Hood.

Prerequisites, Microbiology 51, Dairying 51.

83. **I.** Food Microbiology. — For seniors; juniors may elect. A study of food preservation by means of drying, canning, refrigerating and addition

of chemicals will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased foods, will receive consideration. Contamination of food supplies by means of water, handling, exposure, diseased persons, etc., is of especial significance, and will be demonstrated by laboratory exercises. One hour will be scheduled.

10 laboratory hours, credit, 5.
Professor Marshall and Mr. Hood.

Prerequisite, Microbiology 51.

Physics.

Professor Hasbrouck, Associate Professor Robbins.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

Required Courses.

25. **I.** General Physics. — Sophomores. Mechanics of solids and fluids. This course includes statics, with equilibrium of rigid bodies, work, energy and friction; kinetics, considering rectilinear motion and motion in a curved path; harmonic motion; rotation of rigid bodies, including kinematics of rotation; liquids and gases, with properties of fluids at rest and in motion; properties of matter and its internal forces, including elasticity, capillarity, surface tension.

3 class hours. 1 2-hour laboratory period, credit, 4.
Professor Hasbrouck and Associate Professor Robbins.

26. **II.** Electricity and Magnetism. — Sophomores. The work in electricity includes such subject-matter as magnetism, electrostatics, electric currents with their production, chemical, heating and mechanical effects; battery cells, measurement of voltage, current flow and resistance, motors and generators.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Robbins.

Elective Courses.

27. **III.** Heat and Light. — For sophomores; juniors and seniors may elect. Thermometry, expansion, colorimetry and specific heat, transmission of heat, changes of state, radiation and absorption. Wave theory of light, optical instruments, analysis of light, color, interference, diffraction, polarization.

4 class hours. 1 2-hour laboratory period, credit, 5.
Professor Hasbrouck and Associate Professor Robbins.

50. **I.** Electricity, Heat and Light. — For juniors; seniors may elect.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Robbins.

Prerequisite, Physics 27.

51. **II.** Electricity, Heat and Light. — For juniors; seniors may elect. Continuation of Course 50.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Robbins.

Prerequisite, Physics 50.

52. **III.** Electricity, Heat and Light. — For juniors; seniors may elect. Continuation of Courses 50 and 51.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Robbins.

Prerequisite, Physics 51.

Veterinary Science.

Professor Paige, Associate Professor Gage.

[The courses in veterinary science have been arranged to meet the needs of students who propose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

50. **I.** Veterinary Hygiene and Stable Sanitation. — For juniors; seniors may elect. This course is intended to familiarize the student with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals.
5 class hours. Credit, 5.
Professor Paige.

51. **II.** General Veterinary Pathology. Materia Medica and Therapeutics. — For juniors; seniors may elect. In this course such fundamental and general pathological conditions are studied as inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in the diagnosis, prevention and treatment of disease. The course in pathology is followed by one in materia medica and therapeutics, dealing with the origin, preparation, pharmacology, pharmacy, administration and therapeutic use of the more common drugs. Poisonous plants and symptoms and treatment of plant poisoning are also considered.
5 class hours. Credit, 5.
Professor Paige.

75. **I.** Comparative (Veterinary) Anatomy. — For seniors; juniors may elect. The anatomy of the horse is studied in detail, and that of other farm animals compared with it where differences exist. This course is essential for those students wishing to elect Course 76.
5 class hours. Credit, 5.
Professor Paige.

76. **II.** Theory and Practice of Veterinary Medicine; General, Special and Operative Surgery. — For seniors; juniors may elect. A course intended to familiarize the student with the various medical and surgical diseases of the different species of farm animals. Particular attention is given to diagnosis and first-aid treatment. The student is taught the technique of simple surgical operations that can with safety be performed by the stock

owner. Lectures, demonstrations and practice. This course should be taken in conjunction with Course 51.

5 class hours. Credit, 5.

Professor PAIGE.

Prerequisite, Veterinary 75.

78. **I.** ESSENTIALS OF GENERAL PATHOLOGY. — For seniors; juniors may elect. This course is planned to introduce the student to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis will be considered in the laboratory. The various chemical and biological reactions and tests will be presented from the standpoint of pure science, showing applications of chemistry and biology. The course will serve to liberally educate and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work.

2 3-hour laboratory periods, credit, 3.

Associate Professor GAGE.

79. **II.** ESSENTIALS OF GENERAL ANIMAL PATHOLOGY. — For seniors; juniors may elect. This is a continuation of Course 78, and is devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease will be considered.

2 3-hour laboratory periods, credit, 3.

Associate Professor GAGE.

Prerequisite, Veterinary 78.

80. **III.** ESSENTIALS OF GENERAL ANIMAL PATHOLOGY. — For seniors; juniors may elect. As stated in Courses 78 and 79.

2 3-hour laboratory periods, credit, 3.

Associate Professor GAGE.

Prerequisite, Veterinary 79.

85. **I.** AVIAN PATHOLOGY. — For seniors; juniors may elect. A course in poultry diseases. The object of this course is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. The work will consist of a systematic study of the diseases of the alimentary tract, liver and abdominal region, followed by a study of the diseases of the respiratory system, circulation and kidneys. The important disease-producing external and internal parasites will be considered; also diseases of the skin and reproductive organs. Lectures and demonstrations.

2 3-hour laboratory periods, credit, 3.

Associate Professor GAGE.

86. **II.** AVIAN PATHOLOGY. — For seniors; juniors may elect. As stated under Course 85, also devoted to the study of some of the special diseases of poultry. Recent methods used in the control of these diseases will be considered

and opportunity offered the student for demonstrating various disease processes by means of prepared slides. Lectures, demonstrations and laboratory work.

2 3-hour laboratory periods, credit, 3.
Associate Professor Gage.

Prerequisite, Veterinary 85.

87. **III.** Avian Pathology. — For seniors; juniors may elect. As stated under Courses 85 and 86.

2 3-hour laboratory periods, credit, 3.
Associate Professor Gage.

Prerequisite, Veterinary 86.

Zoölogy and Geology.

Professor Gordon, Dr. Ball.

Zoölogy.

Required Courses.

25. **I.** General Zoölogy. — Sophomores. This course gives an outline of the underlying principles of zoölogy and an introduction to animal structure.

2 class hours. 2 2-hour laboratory periods, credit, 4.
Professor Gordon and Dr. Ball.

Elective Courses.

27. **III.** Elements of Mammalian or Avian Anatomy. — For sophomores; juniors and seniors may elect. This course is offered as a preparation for work in histology, embryology, general vertebrate zoölogy, etc. It also deals briefly with the essentials of physiology. The course is open to prospective students in physiological chemistry, microbiology, animal husbandry, veterinary sciences, etc.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Gordon and Dr. Ball.

Prerequisite, Zoölogy 25.

50. **I.** Synoptic Invertebrate Zoölogy. — For juniors; seniors may elect. This course gives a synopsis of the distinguishing characters of the different phyla and classes of invertebrates.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Gordon or Dr. Ball.

Prerequisite, Zoölogy 25.

51. **II.** Synoptic Invertebrate Zoölogy. — For juniors; seniors may elect. Continuation of Course 50.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Gordon or Dr. Ball.

Prerequisite, Zoölogy 50.

52. **III.** Synoptic Invertebrate Zoölogy. — For juniors; seniors may elect. Continuation of Courses 50 and 51.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Gordon or Dr. Ball.

Prerequisite, Zoölogy 51.

53. **I.** Elements of Microscopic Technique. — For juniors; seniors may elect. This course gives methods of preparing material for microscopic examination.

3 2-hour laboratory periods, credit, 3.
Professor Gordon.

Prerequisite, Zoölogy 25.

54. **II.** Elements of Histology. — For juniors; seniors may elect. This course involves preparation and study of normal animal tissues.

3 2-hour laboratory periods, credit, 3.
Professor Gordon.

Prerequisites, Zoölogy 27 and 53.

55. **III.** Elements of Histology. — For juniors; seniors may elect. Continuation of Course 54.

3 2-hour laboratory periods, credit, 3.
Professor Gordon.

Prerequisite, Zoölogy 54.

58. **II.** Conservational Zoölogy. — For juniors; seniors may elect. This course aims to bring before the student the great public problems of the conservation of wild life, especially the natural fauna of the State, and the more complete utilization of various forms of animal life on the farm projects.

2 class hours. 1 2-hour laboratory period, credit, 3.
Dr. Ball.

75. **I.** Special Zoölogy.[1] — Juniors, seniors, graduates, vocational students and others may ask, and in most cases may arrange, for special work in zoölogy. Such work as is desired in connection with an undergraduate major in another department, or in connection with a vocational course, should be formulated in consultation with officers having the major or vocational course in charge before the request for the work is made. For juniors, seniors and graduates who desire to extend their knowledge of zoölogy along more advanced or special lines, and who are adequately prepared, provision will gladly be made when possible. Work taken under this title may extend through the year, or may be for one term only.

1 class hour. 2 2-hour laboratory periods; hours by arrangement, credit, 3.
The Department.

Prerequisites, each case will be decided by itself.

76. **II.** Special Zoölogy. — As stated under Course 75.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

Prerequisites, each case will be decided by itself.

[1] Those who desire work in zoölogy as a minor for the degree of master of science or for the degree of doctor of philosophy may elect certain courses offered to juniors or seniors, or may arrange for separate work. The graduate student who elects undergraduate courses must meet the requirements of the graduate standards of work and accomplishment.

77. **III.** Special Zoölogy. — As stated under Course 75.
1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.
Prerequisites, each case will be decided by itself.

78. **II.** Economic Zoölogy. — *Birds in their Relations to Crops, Insects and Man.* — For juniors and seniors; sophomores may elect. This course deals with the broad economic relations of the birds. The student is taught to know the birds and their migrations and distribution.
1 class hour. 2 2-hour periods, credit, 3.
Dr. Ball.

79. **III.** Economic Zoölogy. — *Birds in their Relations to Crops, Insects and Man.* — For juniors and seniors; sophomores may elect. In this course the student reviews what is known of the specific food habits of our most important economic birds, carries his studies into the field, and gets an intimate acquaintance with our Massachusetts birds and their habits in relation to crops, orchards, woodlands and to each other.
2 class hours. 1 2-hour laboratory period, credit, 3.
Dr. Ball.

Geology.

Required Courses.

2. **II.** Agricultural Geology. — Freshmen. The elements of geology in their application to agriculture.
2 class hours. Credit, 2.
Professor Gordon.

Elective Courses.

27. **III.** General Geology. — For sophomores; juniors and seniors may elect. Rock-forming minerals; rock types; rock weathering; dynamical, structural and surface geology. Lectures, map and field work.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Gordon.

DIVISION OF THE HUMANITIES.

Professor Sprague.

Economics and Sociology.

Professor Sprague.

[The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.]

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Elective Courses.

26. **II.** Civilizations, Ancient and Modern. — For sophomores; others may elect. This course studies the evolutionary origin and history of man; characteristics of primitive man, departure from the animal status and beginnings of civilization; origin and development of industries, arts and sciences; the evolution of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern development; characteristic features of the leading civilizations and races of ancient and modern times; beneficial and dangerous factors in American life in view of the history of human civilization.
5 class hours. Credit, 5.
Professor Sprague.

50. **II.** Business and Industry. — For juniors and seniors. The forms, organization, administration and labor problems of business. This course is devoted to the following subjects: methods of organizing, financing and administering corporations and partnerships; forms of business administration, wholesaling, jobbing, retailing, advertising, credits and collections; systems of industrial remuneration for wage earners, co-operation and preserving industrial peace; problems concerned with protective legislation for workmen and employers, sweated industries, prison labor, child labor and industrial education.
5 class hours. Credit, 5.
Professor Sprague.

51. **I.** Introduction to Economic Principles and Problems. — For juniors. This course is devoted to the study of the following subjects: definitions of economic terms, such as wealth, capital, value, etc.; factors of production, exchange and consumption; principles of economic production, supply and demand, diminishing returns, division of labor, productive organization, concentration of capital and labor, trust and monopoly problems, public control of production and distribution; principles of exchange, theories of value, money and its problems; international trade, tariff and free trade theories, American merchant marine, reciprocity, and trade treaties; forms of income, wages, interest, rent, profits and the forces which govern them; principles of spending, economy, luxury, conservation of individual and national resources; principles and agencies for saving, investments, banks, building associations,

insurance of all kinds; schemes for social organization; socialism, communism, industrial democracy. Textbook and readings.
5 class hours. Credit, 5.
Professor Sprague.

75. **I.** Social Institutions and Social Reforms. — For seniors; juniors by permission. This course is devoted to the study of the social institutions, such as the family, the State, property, religions; and to such current problems as eugenics, race suicide, divorce, crime and delinquent classes, prison reform, prevention and treatment of dependents and defectives, poverty, its causes and preventions; constructive modern social reform movements for insurance of wage earners, protection of childhood, assurance of safety, health and play time for all classes. The correctional and charitable institutions of Massachusetts will be studied in considerable detail.
5 class hours. Credit, 5.
Professor Sprague.

77. **III.** Public Finance, Taxation, Money and Banking. — For seniors. This course studies systems and problems of taxation as they are found in Europe and America; objects for spending public revenue; public debts and methods of organizing them; systems of money and currency problems of America; types, methods and functions of banks; economic and financial crises and depressions in the United States; modern war finance. Readings and lectures.
5 class hours. Credit, 5.
Professor Sprague.

History and Government.

Elective Courses.

50. **III.** Government. — For juniors; seniors may elect. This course will cover subjects as follows: forms and working methods of the governments of Great Britain, Germany, France, Russia, Switzerland, New Zealand and Canada; historic types and theories of government; forms and methods of Federal, State and local governments in America; progress and problems of democracy and new reform movements in organization and administration; new tendencies towards social legislation and extension of governmental control over broader interests of the people.
5 class hours. Credit, 5.
Professor Sprague.

75. **II.** History of New England. — For seniors; juniors may elect. Treating New England as a geographical and political unit, this course aims to give a survey of its religious, social, economic and political history. The development of its institutions, the growth of its industries, the spread of its population to other sections of the country, its influence upon national character and politics are phases of the subject which will be discussed. Assigned readings and theses will be required.
3 class hours. Credit, 3.
Miss Jefferson.

Languages and Literature.

Professor Lewis, Associate Professor Neal, Associate Professor Ashley, Associate Professor Mackimmie, Assistant Professor Prince, Assistant Professor Patterson, Miss Goessmann, Mr. Julian, Mr. Rand.

English.

Required Courses.

1. **I.** 2. **II.** 3. **III.** English. — Freshmen. Composition. Intended to teach straight thinking, sound structure, clear and correct expression. Lectures, recitations, theme writing and conferences.
3 class hours each term. Credit, 3 each term.
Assistant Professor Prince, Assistant Professor Patterson and Mr. Rand.

25. **I.** 26. **II.** 27. **III.** English. — Sophomores. A general reading course in English literature.
Two class hours each term. Credit, 2 each term.
Professor Lewis and Miss Goessmann.

Elective Courses in English Language and Literature.

[The elective courses in English fall into two groups. Both groups are intended to increase the student's understanding and appreciation of literature. Group one (Courses 50, 51, 52, 53, 54 and 55) will, besides introducing the student to individual writers, emphasize the life and thought of the times, political, economic and social, in order that the student may realize literature as the expression of individual genius representing (by leading it or summarizing it) the thought and spirit of a period or a social unit. Group two (Courses 75, 77, 79 and 80) will tend more to emphasize form-characteristics, artistic quality or historical development of literary types, or individual great writers. Courses 50, 51, 55, 75, 79 and 80 are offered in 1918–19, Courses 52, 53, 54, 55, 77 and 80 are offered in 1919–20.]

50. **I.** English Poetry in the Nineteenth Century (1919–20). — Alternates with Course 53 for juniors; seniors may elect. A course in history, appreciation and understanding. Some of the writers studied are Gray, Goldsmith, Burns, Coleridge, Wordsworth, Keats, Shelley, Scott and Byron.
3 class hours. Credit, 3.
Assistant Professor Patterson.

51. **II.** English Poetry in the Nineteenth Century (1918–19). — Alternates with Course 54. Juniors; seniors may elect. In general conception this course is like Course 50. Tennyson, Browning, Mrs. Browning, Arnold, the Rossettis and Morris, Swinburne and Clough are among the authors to be studied.
3 class hours. Credit, 3.
Professor Lewis.

57. **III.** English Poetry in the Nineteenth Century. — For juniors; seniors may elect. As stated under Course 51.
2 class hours. Credit, 2.
Professor Lewis.

Prerequisite, English 51.

52. **III.** English Writers from Milton to Pope (1918–19). — For juniors; seniors may elect. A survey course that will emphasize the leading writers of the periods, including Bacon, Milton, Dryden, Addison and the essayists, Swift and Pope. Given every second year.
3 class hours. Credit, 3.
Assistant Professor Patterson.

53. **I.** English Prose in the Nineteenth Century (1918–19). — For juniors; seniors may elect. A course in English prose paralleling Course 51. Some of the writers studied are Johnson, Sterne, Goldsmith, Burke, Miss Burney, Coleridge, Landor, Lamb, DeQuincey and Hazlitt.
3 class hours. Credit, 3.
Assistant Professor Patterson.

54. **II.** English Prose in the Nineteenth Century (1919–20). — For juniors; seniors may elect. This course parallels Course 51. Among the writers considered will be Macaulay, Carlyle, Ruskin, Newman and Arnold.
3 class hours. Credit, 3.
Professor Lewis.

58. **III.** English Prose in the Nineteenth Century. — For juniors; seniors may elect. As stated under Course 54.
2 class hours. Credit, 2.
Professor Lewis.
Prerequisite, English 54.

55. **II.** American Literature. — For juniors; seniors may elect. Intended to give a general survey of literature in America, especially in the nineteenth century, with an introduction to the work of the best known writers, and with especial attention to the relations between national life and history and national thought as expressed in literature. The usual authors — Irving, Cooper, Bryant, Poe, Longfellow, Emerson, Hawthorne, Whittier, Parkman, Lowell, Holmes, Whitman, Lanier — will be discussed, and attention will be given to southern and western authors. Present writers and tendencies will also receive some notice.
3 class hours. Credit, 3.
Assistant Professor Prince.

56. **III.** American Literature. — For juniors; seniors may elect. As stated under Course 55.
2 class hours. Credit, 2.
Assistant Professor Prince.
Prerequisite, English 55.

60. **I.** The Literature of Rural Life. — For juniors; seniors may elect. A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life,

and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities.
3 class hours. Credit, 3.
Miss Goessmann.

61. **II.** The Literature of Rural Life. — For juniors; seniors may elect. As stated under Course 60.
2 class hours. Credit, 2.
Miss Goessmann.

Prerequisite, English 60.

75. **III.** Prose Fiction. — Alternating courses in the short story and the novel. Seniors; juniors may elect. Readings, reports and discussions. Texts (short story): Neal's "Short Stories in the Making" and "To-day's Short Stories Analyzed." [Not given in 1917–18.]
3 class hours. Credit, 3.
Associate Professor Neal.

79. **II.** The Drama. — For seniors; juniors may elect. A cursory survey of early English drama, its origin, forms and meaning, will be followed by a careful study of Shakespeare. Four of his plays will be analyzed in detail, and many others will be read and discussed.
3 class hours. Credit, 3.
Mr. Rand.

80. **III.** The Drama. — For seniors; juniors may elect. The course will trace the development of modern drama, especial attention being given to plays by Congreve, Goldsmith, Sheridan, Robertson, Jones, Pinero, Fitch, Shaw, Moody and Ibsen.
2 class hours. Credit, 2.
Mr. Rand.

Prerequisite, English 79.

Rural Journalism.

[The courses in journalism emphasize rural journalism. They aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant the application of journalistic principles in getting and suitably presenting material adapted to the nonurban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. As practical work, members of the classes supply a feature page for the "Springfield Union," and the "New Bedford Standard." Cordial unofficial relations are maintained with the college paper, "The Massachusetts Collegian."]

Elective Courses.

50. **I.** Foundations of Writing: Exposition. — For juniors; seniors may elect. Advanced composition; planning expository thought; expository structure; specimens, including contemporary articles from farm and rural life publications; some bulletin writing, including presentation of technical information for nontechnical readers.
3 class hours. Credit, 3.
Associate Professor Neal.

51. **II.** Foundations of Writing: Narration and Description. — For juniors; seniors may elect. The fundamental elements of style, word-choice, diction, sentence form and paragraph types. Description of persons, places, objects, industries and productional processes, the temper and characteristic aspects of public gatherings, moods, behavior and character-sketching. Narration of incident, sustained action, events in series and the like, as in biography, dramatic situation, history and fiction.
3 class hours. Credit, 3.
Associate Professor Neal.

52. **III.** Foundations of Writing: Magazine Writing. — For seniors; juniors may elect. Study and writing of various forms of magazine and similar articles. [Not given in 1918–19.]
3 class hours or equivalent in laboratory. Credit, 3.
Associate Professor Neal.
Prerequisite, one or more junior courses in journalism, or experience in journalistic work.

53. **I.** News-gathering and News-writing. — For juniors; seniors may elect. The foundation aims and conceptions of journalism. Readings, lectures, quizzes and personal conferences; reporting on runs and on assignment; regular reading of a daily paper and of a weekly review or farm journal, with reports. Central purpose, to develop ability to pick out essentials from inessentials, perceive elements of interest, and present facts which appeal to the reader. This course and Courses 54 and 55 are suited to nonmajoring students whose vocation will require the popular presentation of technical or other information; *e.g.*, extension workers, county agents, agricultural school instructors, experiment-station editors, survey and other social service workers, men engaged in sociological or economic investigations, landscape architects and civil and sanitary engineers.
6 laboratory hours, credit, 3.
Associate Professor Neal.

54. **II.** News-gathering and News-writing. — For juniors; seniors may elect. As outlined under Course 53, except that students who have taken Course 53 will be assigned different readings, and may be given a larger amount of reporting or other writing.
6 laboratory hours, credit, 3.
Associate Professor Neal.

55. **III.** News-gathering and News-writing. — For juniors; seniors may elect. As stated under Courses 53 and 54.
6 laboratory hours, credit, 3.
Associate Professor Neal.

77. **I.** Editorial Materials and Methods. — For seniors; juniors may elect. Readings, quizzes, reports and personal conferences; regular reading of one daily paper and one weekly review or rural life periodical; writing of editorial articles; current events or history. Recommended to nonmajoring students who desire practice in discovering the significant aspects of matters of public attention and in effectively expressing comment thereon.
6 laboratory hours, credit, 3.
Associate Professor Neal.

78. **II.** Editorial Materials and Methods. — For seniors; juniors may elect. As stated under Course 77.

6 laboratory hours, credit, 3.
Associate Professor Neal.

79. **III.** Editorial Materials and Methods. — For seniors; juniors may elect. As stated under Course 77.

6 laboratory hours, credit, 3.
Associate Professor Neal.

80. **I.** Advanced Journalistic Practice. — Seniors. Preparation, editing and publication of a rural life page or periodical.

8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

81. **II.** Advanced Journalistic Practice. — Seniors. As stated under Course 80.

8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

82. **III.** Advanced Journalistic Practice. — Seniors. As stated under Course 80.

8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

Public Speaking.

Required Courses.

1. **I.** 2. **II.** 3. **III.** Public Speaking. — Freshmen. Freshmen public speaking is required in the first, second or third term, at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Much attention, therefore, is given to the preparation and delivery of extempore speeches. Textbook, Robinson's "Effective Public Speaking," supplemented by class work and discussions. First, second or third terms, as directed.
1 class hour. Credit, 1.
Assistant Professor Prince, Assistant Professor Patterson and Mr. Rand.

Elective Courses.

50. **I.** Argumentation. — For juniors; seniors may elect. The course aims to present the fundamental principles of argumentation as applied to oral and written discourse, and intends to develop in the student power to handle argument convincingly and persuasively. Lectures, discussions of leading questions of the day, practice in brief-drawing and the writing of forensics. Textbook, Foster's "Argumentation and Debating." The course is recommended for those who desire to enter the intercollegiate debates.
3 class hours. Credit, 3.
Assistant Professor Prince.

Prerequisite, Public Speaking, 1, 2 or 3.

51. **II.** Occasional Oratory. — For juniors; seniors may elect. The course involves a study of the elements of vocal expression and action; speeches on assigned subjects; prescribed reading; the preparation and delivery of several formal orations. Textbook, Shurter's "The Rhetoric of Oratory." The course is recommended for those who wish to enter the Flint contest.
3 class hours. Credit, 3.
Assistant Professor Prince.
Prerequisite, Public Speaking 1, 2 or 3.

French and Spanish.

Associate Professor Mackimmie.

French.

Required Courses.

1. **I.** 2. **II.** 3. **III.** Elementary French. — Freshmen; open upon arrangement to other students. The essentials of grammar are rapidly taught and will be accompanied by as much reading as possible. This course is required of freshmen presenting German for entrance who do not continue that language and have not studied French.
3 class hours each term. Credit, 3 each term.

4. **I.** 5. **II.** 6. **III.** Intermediate French. — Freshmen; open upon arrangement to other students. Training for rapid reading. The reading of a number of short stories, novels and plays; composition, reports on collateral reading from periodicals and scientific texts in the library.
3 class hours each term. Credit, 3 each term.
Associate Professor Mackimmie.
Prerequisite, required of freshmen who present two years of French for entrance and do not take German.

Elective Courses.

25. **I.** Intermediate French. — For sophomores; open upon arrangement to other students. Training for rapid reading; the reading of a number of short stories, novels and plays; readings from periodicals and scientific texts in the library.
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisites, French 1, 2 and 3.

26. **II.** Intermediate French. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisite, French 25.

27. **III.** Intermediate French. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Associate Professor Mackimmie.
Prerequisite, French 26.

28. **I.** Advanced French. — For sophomores; open upon arrangement to other students. A reading course. Balzac's "Eugénie Grandet" and "Le Père Goriot," and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6.

29. **II.** Advanced French. — For sophomores; open upon arrangement to other students. As stated under Course 28.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6.

30. **III.** Advanced French. — For sophomores; open upon arrangement to other students. General view of the history of French literature; Kastner and Atkins' "History of French Literature." Representative works of the important periods will be studied in class. Outside reading will be required.
3 class hours. Credit, 3.

Prerequisites, French 25 and 26, or French 28 and 29.

50. **I.** Scientific French. — For juniors; seniors may elect. This course is planned to meet the requirements of the individual student, and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required, and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

51. **II.** Scientific French. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

52. **III.** Scientific French. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

75. **I.** French Literature. — For seniors; juniors may elect. The object of Courses 75, 76 and 77 is to give an introduction to recent movements

in French literature. Course 75 will deal with the drama, and plays by Augier, A. Dumas, fils, Delavigne and some contemporary dramatists will be read and studied.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

76. **II.** FRENCH LITERATURE. — For seniors; juniors may elect. This course deals with the novel. Works by Flaubert, the De Goncourts and Zola will be read. Written reports are required on outside reading.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

77. **III.** FRENCH LITERATURE. — For seniors; juniors may elect. Modern criticism. Sainte-Beuve, "Causeries du Lundi" (Harper) and works by Taine and Renan. Reference book, Lanson's "Histoire de la Litterature Française."
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

SPANISH.

Elective Courses.

50. **I.** ELEMENTARY SPANISH. — For juniors; seniors may elect. Open to other students upon arrangement. Grammar, with special drill in pronunciation; exercises in conversation and composition. Reading from a reader and selected short stories.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.

51. **II.** ELEMENTARY SPANISH. — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 50.

52. **III.** ELEMENTARY SPANISH. — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 51.

75. **I.** MODERN SPANISH AUTHORS. — Seniors. Reading from modern Spanish novel and drama. Translation of English into Spanish. Private reading.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 52.

76. **II.** Modern Spanish Authors. — Seniors. As stated in Course 75. 3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, Spanish 75.

77. **III.** Modern Spanish Authors. — Seniors. As stated in Course 75. 3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, Spanish 76.

German and Music.

Associate Professor Ashley, Mr. Julian.

German.

Required Courses.

1. **I.** 2. **II.** 3. **III.** Elementary German. — Freshmen; open upon arrangement to other students. Grammar composition and reading. Especial attention is given to oral work in German and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German.
3 class hours, each term. Credit, 3 each term.
Associate Professor Ashley and Mr. Julian.

4. **I.** 5. **II.** 6. **III.** Intermediate German. — Freshmen; open upon arrangement to other students. Selected works of Schiller, Heine and Goethe. Grammar review and advanced prose composition.
3 class hours each term. Credit, 3 each term.
Associate Professor Ashley.

Prerequisite, required of freshmen who present two years of German for entrance and do not take French.

Elective Courses.

25. **I.** Intermediate German. — For sophomores; open upon arrangement to other students. Reading of such works as Sudermann's "Frau Sorge," "Wilhelm Tell," "Die Journalisten," etc. Grammar review.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisites, German 1, 2 and 3.

26. **II.** Intermediate German. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisite, German 25.

27. **III.** Intermediate German. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisite, German 26.

28. **I.** Advanced German. — For sophomores; open upon arrangement to other students. Reading and studying of Goethe's most important literary productions.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisites, German 4, 5 and 6.

29. **II.** Advanced German. — For sophomores; open upon arrangement to other students. Development of the German novel; rapid reading of great novelists.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisite, German 28.

30. **III.** Advanced German. — For sophomores; open upon arrangement to other students. As stated under Course 29.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisite, German 29.

50. **I.** Scientific German. — For juniors; seniors may elect. Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

51. **II.** Scientific German. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisite, German 50.

52. **III.** Scientific German. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisite, German 51.

75. **I.** German Literature. — Seniors. Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust" and one modern typical drama.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisites, German 28, 29 and 30.

76. **II.** German Literature. — Seniors. As stated under Course 75.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisite, German 75.

77. **III.** German Literature. — Seniors. As stated under Course 75.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisite, German 76.

78. **I.** Conversation and Composition. — For seniors; juniors may elect. Translating connected English into German. Reproducing outside readings in German orally in class.
1 class hour. Credit, 1.
Associate Professor Ashley.
Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

79. **II.** Conversation and Composition. — For seniors; juniors may elect. As stated under Course 78.
1 class hour. Credit, 1.
Associate Professor Ashley.
Prerequisite, German 78.

80. **III.** Conversation and Composition. — For seniors; juniors may elect. As stated under Course 78.
1 class hour. Credit, 1.
Associate Professor Ashley.
Prerequisite, German 79.

Music.

Elective Courses.

50. **I.** History and Interpretation of Music. — For juniors; seniors may elect. History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school, — Bach, Händel, Haydn, Gluck and Mozart.
1 class hour. Credit, 1.
Associate Professor Ashley.

51. **II.** History and Interpretation of Music. — For juniors; seniors may elect. A continuation of Course 50. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera.
1 class hour. Credit, 1.
Associate Professor Ashley.

52. **III.** History and Interpretation of Music. — For juniors; seniors may elect. The Modern school and Modern composers.
1 class hour. Credit, 1.
Associate Professor Ashley.

DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agricultural Economics.

Professor Cance, Mr. Wilkinson.

Required Course.

26. **II.** Agricultural Industry and Resources. — Sophomores. A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions.
5 class hours. Credit, 5.
Professor Cance and Mr. Wilkinson.

Elective Courses.

50. **I.** Elements of Agricultural Economics. — For juniors; seniors may elect. This course is designed to accompany or follow the course in elements of economics. It deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; principles of rural credit; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work.
5 class hours. Credit, 5.
Professor Cance.

51. **III.** Historical and Comparative Agriculture. — For juniors; seniors may elect. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Students in education and rural journalism should find this course helpful.
5 class hours. Credit, 5.
Mr. Wilkinson.

52. **II.** Co-operation in Agriculture. — For juniors; seniors may elect. The course treats of the history, principles and business relations of agricultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements;

(2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, practical working plans for co-operative associations, with particular reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises.

5 class hours. Credit, 5.

Professor CANCE.

53. **III.** THE AGRICULTURAL MARKET.—For juniors; seniors and graduate students may elect. A study of the forces and conditions which determine the prices of farm products and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market and direct sales are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work.

5 class hours. Credit, 5.

Professor CANCE.

76. **II.** TRANSPORTATION OF AGRICULTURAL PRODUCTS. — For seniors and graduate students; juniors may elect. This course deals with transportation in the United States, covering highways, waterways, railways and electric ways, with reference to the facilities for and cost of transporting farm products, opening up new agricultural areas or industries, and contributing to the wealth and welfare of the agricultural population. Lectures, text and field work.

5 class hours. Credit, 5.

Professor CANCE.

77. **I.** PROBLEMS IN AGRICULTURAL ECONOMICS. — For seniors and graduate students; juniors may elect. An advanced course for students desirous of studying more intensively some of the economic problems affecting the farmer. Some of these are: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems, — cost of producing farm products, farm labor in New England, immigration, agricultural credit. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest.

5 class hours. Credit, 5.

Professor CANCE and Mr. WILKINSON.

78. **III.** AGRICULTURAL CREDIT FACILITIES. — For seniors and juniors. The legitimate use of credit in the production, storing and marketing of agricultural products. A brief survey of the development of credit institutions. National and State rural credit laws. Farm land banks, credit associations, and other means of securing personal credit. The topics will be discussed from the standpoints of dealers in agricultural produce, the landowning farmer, the tenant and the farm laborer; special attention will be given to the credit needs of the college graduate.

3 class hours. Credit, 3.

Mr. WILKINSON.

80. **I.** Seminar. — For seniors and graduate students. Research in agricultural economics and history; problems of New England agriculture. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged.

1 2-hour laboratory period, credit, 1.
The Department.

81. **II.** Seminar. — For seniors and graduate students. As stated in Course 80.

1 2-hour laboratory period, credit, 1.
The Department.

82. **III.** Seminar. — For seniors and graduate students. As stated in Course 80.

1 2-hour laboratory period, credit, 1.
The Department.

Agricultural Education.

Professor Hart.

Elective Courses.

50. **I.** Meaning of Education (Psychology). — For juniors; seniors may elect. For teachers and others desiring an introduction to mental science. A study of the development, structure and functions of the nervous system and the sense organs; the development and nature of mental activities; the nature of the learning processes.

5 class hours. Credit, 5.
Professor Hart.

51. **II.** Teachers' Training Course. — For juniors; seniors may elect. Primarily for teachers. A study of agricultural education; the theory and practice of teaching; rural school organization; methods of instruction; the place and function of agriculture in the course of study for both rural and city schools; planning and practical work in school and home gardens.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor Hart.

53. **III.** History and Philosophy of Education. — For juniors; seniors may elect. For teachers and others desiring an introduction to educational theories. A study of educational ideals and movements as exemplified by leading nations and races; the growth of educational institutions as influenced by science and industry; the history and meaning of industrial and agricultural education.

5 class hours. Credit, 5.
Professor Hart.

80. **I.**, 81. **II.**, 82. **III.**, 83. **IV.** Teachers' Training Course. — For seniors. Supervised apprentice teaching.

1 conference or more. 3 to 5 class periods of teaching, credit, 5.
Professor Hart.

75. **I.** Problems in Rural Education. — For seniors. For teachers or others interested in special phases of education, such as child development, physical and mental; school organization; rural schools; secondary schools; school programs; grading and promotion of pupils; school grounds and school architecture and equipment; normal schools and the preparation of teachers; agricultural teaching and agricultural schools.
4 class hours. Credit, 4.
Professor Hart.

76. **II.** Problems in Rural Education. — Seniors. As stated under Course 75.
4 class hours. Credit, 4.
Professor Hart.

77. **II.** Extension and County Agent Work. — For seniors. The course consists chiefly of library research work. Each student will be required to produce one or more complete lectures under guidance both as to method of preparation and subject-matter, and one or more demonstrations. These lectures will be presented to public audiences in the presence of a board of critics. Some instruction will be given in organization and administration of the Extension Service. The Extension Service will be responsible for the public presentation and criticism. The student's major adviser will be responsible for the accuracy of the subject-matter. The Department of Agricultural Education will be responsible for the preparation of the lectures.
2 class hours. 4 2-hour laboratory periods, credit, 5.
Professor Hart.

78. **III.** Extension and County Agent Work. — For seniors. As stated under Course 77.
2 class hours. 4 2-hour laboratory periods, credit, 5.
Professor Hart.

Rural Sociology.

Professor Phelan, President Butterfield, Professor Hart, Mr. Novitski.

Required Course.

27. **III.** Elements of Rural Sociology. — Sophomores. A broad survey of the field of rural sociology, including such topics as the origin of rural sociology, its methods and problems; relation of sociological to the scientific and technical aspects of agricultural problems; the development of the rural community in New England and the west, religious, educational and social ideals of rural people; characteristics and influence of the rural environment, the movement of the rural population, the effects of immigration; rural institutions, the school, the church, local government, effects of modern conditions of life on rural institutions; rural organization; problems of progress, an analysis of the needs of rural life in its further development. Lectures, readings and essays on assigned topics.
3 class hours. Credit, 3.
Professor Phelan and Mr. Novitski.

Elective Courses.

50. **I.** Social Condition of Rural People. — For juniors; seniors may elect. A. The rural status: composition of the rural population, nature, extent and causes of diseases and accidents, health agencies of control; extent and causes of rural delinquency and dependency, conditions of temperance of sexual morality and family integrity; child labor, women's work and position; standard of living, size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics.

B. Rural social psychology: characteristics of the rural mind, character of hereditary and environmental influence; nature and effect of face-to-face groups; fashion, conventionality, custom, character of discussion and of public opinion.

3 class hours. Credit, 3.

Professor Phelan.

51. **II.** Rural Government. — For juniors; seniors may elect. A general survey of the development of rural government in the United States, origin of the New England town, its influence upon the west, advantages, development of efficiency, county government, the influence of the farmer in legislation, good roads movement, credit, facilities, taxation, boards of agriculture, agricultural colleges and experiment stations in relation to rural welfare; national government; a general survey of political organizations and movements among farmers in the United States and foreign countries and their influence in shaping legislation; relation of the Department of Agriculture, postal system, the various national commissions and agencies to rural welfare. Lectures, readings, written exercises on assigned topics.

3 class hours. Credit, 3.

Professor Phelan and Mr. Novitski.

52. **III.** Rural Organization. — For juniors; seniors may elect. A study of the organized agencies by which rural communities carry on their various forms of associated life, particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment; principles underlying leadership, qualifications of the paid leader and the lay leader; the field of rural social service, national, State and local, preparation and opportunity for service; rural community building, a study of organized ways and means by which aid is given local communities.

3 class hours. Credit, 3.

President Butterfield.

75. **I.** Farmers' Organizations. — For seniors; juniors may elect. The history, purposes and achievements of the grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; the method, scope and history of local, State and national associations formed about some farm product, their influence in forming class consciousness and in shaping agrarian legislation; need of federation. Lectures, readings and essays on assigned topics.

3 class hours. Credit, 3.

Professor Phelan.

76. **I.** Field Work in Rural Sociology. — For seniors; juniors may elect. This course is designed to meet the needs of students who wish to do some constructive work in rural social service while still in college. The work will be carried on in co-operation with the various college agencies engaged in rural service. Any project for which credit in this course is to be asked must first have the approval of the head of the department.

From 2 to 6 laboratory hours, credits, 1 to 3.
Professor Phelan.

Prerequisites, Rural Sociology 27 and 52.

77. **II.** Rural Social Surveys. — For seniors; juniors may elect. A careful study of the theory and function of statistics, the limitations and difficulties in the use of statistics, the interpretation of statistical data, various methods of graphic representation; a study of surveys, kinds and use, method of gaining information, the basis for conclusions, value of information gained. Text and lectures.

3 class hours. Credit, 3.
Professor Phelan.

78. **II.** Rural and Business Law. — For seniors; juniors may elect. The work of this course will cover such points as land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures and class discussions.

5 class hours. Credit, 5.
Professor Hart.

79. **I.** Seminar. — Credits, 1 to 3. Professor Phelan.

80. **II.** Seminar. — Credits, 1 to 3. Professor Phelan.

81. **III.** Seminar. — Credits, 1 to 3. Professor Phelan.

GENERAL DEPARTMENTS.

Military Science and Tactics.

Col. R. H. Wilson, U. S. A., retired; Ordnance Sergeant J. J. Lee, U. S. A., retired.

A Reserve Officers Training Corps was established at this college pursuant to paragraph IX., Bulletin 6, Jan. 29, 1917. Instruction in military science and tactics of an infantry unit of the Reserve Officers Training Corps was begun on April 1, 1917, and has been continued during the year, following the course of training prescribed for infantry units of the senior division in General Orders No. 49, War Department, Sept. 20, 1916.

The department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-year course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical courses (drill) in military science are given in the first and third terms; the corresponding courses in physical education in the second term.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor.

Members of the Reserve Officers Training Corps who elect the advanced courses and are recommended by the President and the commandant, may take the course prescribed for the Reserve Officers Corps by entering a training company for six months, being paid at the rate of $100 per month while attending the camp. They obligate themselves to serve in the Reserve Officers Corps for ten years, receiving pay of their rank when called into the service of the United States for any duty.

The required uniform is of olive drab woolen cloth, costing about $34, of which $14 is borne by the government. It is worn by all cadets when on military duty, and may be worn at other times, and will be considered the property of the United States for one scholastic year. Students upon entering college are required to deposit about $20 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited unless the consent of the commandant be obtained.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Required Courses.

1. **I.** Tactics. — Freshmen. Theoretical instruction through the school of the soldier, squad and company. Lectures on military subjects.
1 class hour. Credit, 1.
Colonel Wilson.

2. **II.** Tactics. — Freshmen. As stated under Course I.
1 class hour. Credit, 1.
Colonel Wilson.

3. **III.** Tactics. — Freshmen. Theory of target practice, map reading, service of security. Personal hygiene.
1 class hour. Credit, 1.
Colonel Wilson.

4. **I.** Drill. — Freshmen. Practical instruction in Infantry Drill Regulations, school of the soldier, squad and company, close and extended order. Preliminary instruction, position, sighting and aiming drills. Gallery practice.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

5. **II.** Drill. — Freshmen. Physical drill, Koehler's Manual. Gallery practice.
1 class hour. Credit, 1.
Professor Hicks and Sergeant Lee.

6. **III.** Drill. — Freshmen. As stated under Course 4.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

25. **I.** Tactics. — Sophomores. United States Infantry Drill Regulations, to include school of the battalion and combat. Small-arms firing regulations. Lectures, map reading, camp sanitation and camping expedients.
1 class hour. Credit, 1.
Colonel Wilson.

26. **II.** Tactics. — Sophomores. As stated under Course 25.
1 class hour. Credit, 1.
Colonel Wilson.

27. **III.** Tactics. — Sophomores. Lectures on military history, service of information and security, marches and camps.
1 class hour. Credit, 1.
Colonel Wilson.

28. **I.** Drill. — Sophomores. Infantry Drill Regulations to include school of the battalion, ceremonies, first-aid instruction. Range and gallery practice, and combat firing.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

29. **II.** Drill. — Sophomores. Physical drill, Koehler's Manual. Gallery practice.
1 class hour. Credit, 1.
Professor Hicks and Sergeant Lee.

30. **III.** Drill. — Sophomores. As stated under Course 28.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

Elective Courses.

50. **I.** Military Science. — Juniors. Minor tactics; field orders (studies in minor tactics); map maneuvers.
1 class hour. Credit, 1.
Colonel Wilson.

51. **II.** Military Science. — Juniors. Minor tactics; elements of international law; property accountability; method of obtaining supplies and equipment.
3 class hours. Credit, 3.
Colonel Wilson.

52. **III.** Military Science. — Juniors. As stated under Course 51.
3 class hours. Credit, 3.
Colonel Wilson.

53. **I.** Drill. — Juniors. Duties consistent with rank as cadet officers or noncommissioned officers in connection with the practical work and exercises laid down for the unit.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

54. **II.** Drill. — Juniors. As stated under Course 53.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

55. **III.** Drill. — Juniors. As stated under Course 53.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

75. **I.** Military Science. — Seniors. Tactical problems, small forces, all arms combined; map maneuvers; court-martial proceedings.
3 class hours. Credit, 3.
Colonel Wilson.

76. **II.** Military Science. — Seniors. International relations of America from discovery to present day, and gradual growth of principles of international law, embodied in American diplomacy, legislation and treaties.
3 class hours. Credit, 3.
Colonel Wilson.

77. **III.** Military Science. — Seniors. Lectures on psychology of war and general principles of strategy.
3 class hours. Credit, 3.
Colonel Wilson.

78. **I.** Drill. — Seniors. As stated under Course 53.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

79. **II.** Drill. — Seniors. As stated under Course 53.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

80. **III.** Drill. — Seniors. As stated under Course 53.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

Officers and noncommissioned officers conduct drill of lower classes. Field officers and captains are appointed from this class. The positions in every case are obtained by competition. It is to be understood that cadets obtaining these positions will be reported to the Adjutant-General of the army as distinguished cadets.

Physical Education and Hygiene.

Professor Hicks, Assistant Professor Gore,[1] Mr. Dickinson.[2]

[All classified undergraduate male students are given a physical examination upon entering.]

Men.

Required Courses.

1. **I.** Hygiene. — Freshmen. Lectures on personal hygiene.
1 class hour. Credit, 1.
Professor Hicks.

2. **I.** Recreation. — Freshmen. Outdoor games.
1 laboratory hour. Credit, third term.
Mr. Dickinson.

3. **III.** Recreation. — Freshmen. Outdoor games.
1 laboratory hour. Credit for Nos. 2 and 3, 1.
Mr. Dickinson.

25. **I.** Recreation. — Sophomores. Outdoor games.
1 laboratory hour. Credit, third term.
Mr. Dickinson.

26. **III.** Recreation. — Sophomores. Outdoor games.
1 laboratory hour. Credit for Nos. 25 and 26, 1.
Mr. Dickinson.

Course Elective during Emergency.

51. **II.** Gymnastics. — Juniors not members of Reserve Officers Training Corps.
2 laboratory hours. Credit, 1.
Professor Hicks.

Elective Course.

77. **III.** Training Course. — Seniors. Election by permission only. History of physical education and supervision of athletics.
1 class hour. Credit, 1.
Professor Hicks.

[1] On leave. [2] Temporary substitute.

WOMEN.

Required Courses.

4. **I.** RECREATION. — Freshmen. Outdoor games.
3 laboratory hours. Credit, 1.

5. **II.** GYMNASTICS. — Freshmen. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.

6. **III.** RECREATION. — Freshmen. Outdoor games.
3 laboratory hours. Credit, 1.

27. **I.** RECREATION. — Sophomores. Outdoor games.
3 laboratory hours. Credit, 1.

28. **II.** GYMNASTICS. — Sophomores. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.

29. **III.** RECREATION. — Sophomores. Outdoor games.
3 laboratory hours. Credit, 1.

Elective Courses.

50. **II.** GYMNASTICS. — Juniors. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.

76. **II.** GYMNASTICS. — Seniors. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.

THE GRADUATE SCHOOL.

THE
JOHN CRERAR
LIBRARY

The Graduate School.

Kenyon L. Butterfield, A.M., LL.D., President of the College.

Charles H. Fernald, Ph.D., Honorary Director of the Graduate School.

Charles E. Marshall, Ph.D., Director of the Graduate School and Professor of Microbiology.

Graduate Staff, 1916–17.

Associate Professor Beaumont, Professor Cance, Professor Chamberlain, Assistant Professor O. L. Clark, Professor Crampton, Professor Fernald, Professor Foord, Professor Graham, Assistant Professor Hecht, Dr. Itano, Assistant Professor Jones, Professor Lindsey, Professor McNutt, Professor Osmun, Professor Peters, Professor Phelan, Professor Sears, Professor Waugh, Director Marshall, President Butterfield; Mr. Watts, Secretary.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years; the degrees of master of agriculture and doctor of agriculture are now granted to meet strictly professional needs. The number of requests for each of these courses is apparently increasing. In recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station specialists in farm management, dairying, live-stock husbandry, poultry science, agronomy, landscape gardening, pomology, vegetable gardening and floriculture; for positions as bacteriologists, botanists, chemists, entomologists; and for numerous other positions requiring a great amount of scientific and professional knowledge, training and experience.

Organization.

The school is based upon the department as the unit, and the apprenticeship system as the most effective means of instruction. This gives to the student individuality in treatment and an intimacy with actual conditions of work and operations. Besides, each student is assigned to an advisory committee, composed of the instructor in charge of his major subject as chairman, and instructors in charge of his minor subjects as members, which directs his graduate studies. The chairmen of all these committees together constitute the graduate staff, which controls the policy of the graduate school.

Admission.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricul-

tural College, he will be required to make up such parts of the undergraduate work in that subject as the instructor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership in the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Nature, Methods and Requirements of Graduate Work.

Graduate work differs from undergraduate work in its purposes and methods. The primary aims of the instructor are emphasized in an attempt to have the student adjust himself and place himself in his environment; develop the rule of self-direction and self-instruction; acquire the power of accurate reasoning; gain proficiency and skill in his selected field of study or practice; and obtain an appreciative and discriminative insight into experimentation and original research. Methods are not devised, therefore, for attractiveness, entertainment and superficial reviews, but for the creation of initiative and profound thought, thorough acquaintance with detail, independent advance and industrious habits. Careful readings, lectures, conferences, surveys, laboratory exercises and field work are some of the agencies utilized.

All members of the graduate school are required to attend the course of lectures designed to supplement the technical work of all graduate studies. These lectures will be given once each week, and the students will be held responsible for the work. [Suspended during continuance of the war.]

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as a major and the other as a minor. These subjects may not be selected in the same department. An original thesis is considered a part of the major subject.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major and the others as minors. No two of these subjects may be taken in the same department. An original thesis shall be considered a part of the major subject.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary properly to equip the individual professionally.

Candidates for the degree of doctor of agriculture are required to select a major and such other subjects as will develop the major in its greatest intensity and comprehensiveness. Successful experience is also requisite, together with a thesis which represents a masterly survey or intimate study through accurate application of some phase of the major subject.

Candidates for the degree of master of landscape architecture will be expected to conform to the established courses of the department, and to the

requirements of the department in the preparation of a thesis, as well as in actual experience outside the college.

Candidates for membership in the graduate school who do not desire to work for a degree may, with the approval of the director of the school, take more than one subject in the same department, or pursue work in several departments, if their preparation will permit. A statement of the subjects chosen must in each case be submitted to the director of the graduate school for approval by the student's advisory committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised and credit granted as are essential to the highest standards of efficiency.

Theses.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject; must show that its writer possesses the ability to carry on original study; and must be an actual contribution to knowledge.

The thesis in its final form, must be submitted to the director by May 15 of the year in which the student is to present himself for the advanced degree, and before he may take the required examination. Three complete copies are required. One of the said copies is to be retained as an official copy by the said director, one is to be deposited in the college library, and the third is to be retained by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis.

Final Examinations.

For the degree of master of science, master of agriculture, or master of landscape architecture, final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degrees of doctor of philosophy or doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

Degrees conferred.

The degrees of master of science, master of agriculture and master of landscape architecture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half[1] to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence. In the case of a master of landscape architecture the student must follow the prescribed course of study.

[1] All time statements refer to minimum time.

2. The earning of not less than fifty credits in the chief or major subject, and of not less than twenty-five credits in the minor subject. Students pursuing the course in landscape architecture will devote all of their time to the established course, and meet the conditions of one year of experience outside the college.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary. The thesis may be waived for the degree of master of agriculture.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The earning of not less than one hundred credits in the chief or major subject, and of not less than twenty-five credits in each of two minor subjects.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the instructors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science, master of agriculture, or master of landscape architecture is $10, and for the degree of doctor of philosophy or doctor of agriculture, $25.

Courses offered.

Courses available as major subjects for the degree of doctor of philosophy: —

Agricultural economics
Botany.
Chemistry.
Entomology.
Horticulture.
Microbiology.
Rural sociology.

Courses available as major subjects for the degree of master of science: —

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.

Courses available as major subjects for the degree of master of agriculture: —

Agronomy. Animal husbandry. Poultry science.

The course in landscape architecture leads to the degree of master of landscape architecture.

Courses available as minor subjects for the degree of doctor of philosophy: —

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape architecture.
Microbiology.
Poultry science.
Rural sociology.
Zoölogy.

Courses available as minor subjects for the degree of master of science: —

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape architecture.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.
Zoölogy.

General Outline of Courses for Advanced Degrees.

Agricultural Economics (Major Course). — 1. Graduate research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances the method includes facility in investigation, tabulation and interpretation of results.

2. Candidates for the doctorate, the master's degree, or candidates offering a minor in agricultural economics, will be required to pass an examination covering the undergraduate work now offered in agricultural economics, including Course 50, the elements of economics, Course 75, the agricultural market and Course 52, co-operation in agriculture; and in addition such definite research work as may be outlined by the department, to consist of original investigations in some particular divisions of the subject of agricultural economics. Courses 52, 75, 76 and 77 are for graduates and undergraduates. Special investigations may be made by electing seminars in agricultural economics.

3. Candidates for the doctor's degree will be required to write a thesis, and candidates for the master's degree a thesis or a report, covering results of a specific line of personal investigation in one or more fields of the subject. Each candidate will also be required to have a working knowledge of the general field of economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, agricultural credit, statistics of agriculture and prices, and markets and marketing.

Agricultural Education (Major Course). — Courses are available in agricultural education as major or minor subjects for the degree of master of science, or, as a minor subject, for the degree of doctor of philosophy. Study will be pursued along one or several of the following lines: —

1. Massachusetts school legislation.

2. Origin and growth of primary, secondary and higher education in Massachusetts.

3. The origin and growth of normal schools, industrial schools and agricultural schools.

4. Educational literature, fiction, periodicals and reports.

5. The physical and mental development of the individual.

6. School administration.

Agronomy (Master of Science). — This course is developed in two directions, depending on whether the candidate is preparing for investigational work or for teaching. In the former case more attention is paid to methods of investigation; in the latter, to interpretation of results. The student may specialize in either Part I. or Part II. of the following: —

I. *Soil Fertility.* — (*a*) The humus problem: Effect of different cropping systems on the humus content of the soil; cultivation, drainage and liming in their effect on soil humus; increase by green manure crops; use of animal manures as sources of humus; conservation of organic matter.

(*b*) The nitrogen question: Losses of nitrogen as occasioned by cropping systems, tillage methods and soil treatment; gain of nitrogen through legumes and other agencies; commercial nitrogen, physiological effect upon the plant, comparison of different forms both in regard to their ultimate as well as immediate effect, amount of application from the business standpoint.

(*c*) Mineral elements of plant food: As above for nitrogen.

(*d*) Lime: Causes of "soil acidity;" comparison of forms of lime; ultimate effect of lime on soil fertility; cost *versus* returns from use of lime.

(*e*) Crop adaptability.

II. *Field Crops.* — (*a*) Distribution, as governed by soil fertility; climatic influences; economic conditions.

(*b*) Kinds and varieties.

(*c*) Cultural methods.

(*d*) Breeding: A knowledge of the principles of breeding is presupposed. With this as a basis, a study of methods, practices and results, as applied to a given crop, must be made.

III. *Thesis.* — The thesis may be taken either in soil fertility or in crop production. In either case a problem for original investigation must be formulated by the candidate, the line of attack developed, the work carried through and results presented in acceptable form.

Literature. — It is required that the candidate familiarize himself with the available literature of the various topics studied.

Animal Husbandry (Master of Science). — *Course A. Animal Breeding.* — 1. Reading: Thorough survey of the scientific works dealing with plant and animal breeding and improvement.

2. Project: Each student must outline and pursue some Mendelian problem.

3. Thesis: This is to be a complete treatise of the problem which the student undertakes; it should be a valuable contribution to the present knowledge of the question of animal breeding.

Course B. Animal Nutrition. — This course is in outline similar to A. It is designed to cover the field of nutrition, feeding and management of live stock.

Seminar: Regular periods will be devoted to a discussion of the projects undertaken, together with criticisms of the available material on the question pursued.

Object. — To give the student a comprehensive knowledge of feeding, breeding and management of live stock. This may be divided into a major and a

minor, in order to give the student the opportunity of devoting a proportionate share of his time to the class of live stock in which he is particularly interested.

Reading. — The student is to make a very complete survey of experimental and periodical literature dealing with the various phases of the subject.

Practice. — Before the completion of the work for the degree, the student must have the equivalent of at least one year's continuous work on an approved live-stock farm.

Seminar: Regular periods to discuss progress of the work.

Animal Pathology (Minor Course only). — 1. Reviews in anatomy.

2. Reviews in organography and histology.

3. Special lectures and readings in general and special pathology.

4. Laboratory studies in general and special pathology.

5. Pathological technique.

6. Conferences.

Botany (Major Courses). — The equivalent of certain undergraduate courses, determined in the case of each student by the department, is prerequisite. Candidates for the degree of master of science are required to pass a final examination in writing. A final examination in writing before the department and an oral examination before the graduate staff must be passed by candidates for the degree of doctor of philosophy. Candidates for the latter degree are required to attend all graduate lectures given by the department. Candidates for the degree of master of science will take those lectures given during their period of study in the department. All lecture courses will be given in rotation, except courses (*a*) and (*b*), which will come every year. There will be three lectures a week throughout the fall, winter and spring terms. These lecture courses, outlined below, are designed to cover a period of three years.

(*a*) *Plant Physiology.* — The lectures will consider, under the nutrition of the plant: its chemical structure, absorption of various nutrient substances and their changes in the plant, assimilation and dissimilation of carbon and nitrogen by autotrophic and heterotrophic plants; under changes in the form of plants: growth and form under constant external factors, the influence of variable external and inner factors on growth, form and development; and under plant movements: the various tropisms, nutations, etc. Supplemental demonstrations, laboratory work and readings in the standard texts and journals. One lecture a week for 36 weeks.

(*b*) *Plant Pathology.* — A general consideration of the history, nature and causes of plant disease; parasitism, predisposition, immunity, degeneration, natural and artificial infection, dissemination, epidemics, biologic strains, monstrosities and malformations, proliferation, prevention and control, economics of plant diseases. One lecture a week for 36 weeks.

(*c*) *Normal and Pathogenic Metabolism.* — The lectures in this subject embrace, in more or less detail, comparative consideration of the metabolism of the host in health and disease; the metabolism of the parasite under varying conditions; enzyme activities in host and parasite; methods of preparation and determination of enzyme activities; chemical and physical changes induced in plant tissue by parasites; immunity, etc. Current investigations and new phases of the subjects under discussion will also receive attention as they appear. One hour a week for 24 weeks.

(*d*) *Plant Evolution.* — Consideration of plant life in its inception; differentiation; origin and evolution of sexual and asexual reproduction; variation;

heredity and adaptation; phylogenetic relationships. One lecture a week for 24 weeks.

(*e*) *Biologic Relations.* — Consideration of certain phases of the morphological and physiological adaptations of plants with regard to insect visit; the rôle of thorns, hairs, tendrils, glands, etc. Various experiments will be made to test out experimentally some of the existing theories concerning biologic adaptations. One lecture a week for 12 weeks.

(*f*) *The Ecology of Plants.* — This course deals with the water, light and temperature relations of plants, and the various adaptations in response to these factors; the various types of plant formation; the migration of plants; the competition of plants; invasion and successions of plants under varied conditions; and the various types of alternations and zonations. One lecture a week for 12 weeks.

(*g*) *Physiological Plant Pathology.* — This course considers those plant diseases not due to bacterial or fungous parasites, but resulting from unfavorable physical or chemical conditions of the soil; from harmful atmospheric influences, such as too dry air, too much moisture, hail, wind, lightning, frost; from injurious gases and liquids; from lack of or too much light; from wounds. A knowledge of the normal physiology of the plant is required. Demonstrations and laboratory work will be given, together with assigned readings. One lecture a week for 12 weeks.

(*h*) *History of Botany.* — A historical survey of the science; history of certain culture plants, such as wheat, corn, coffee, potato, rice, and their influence on civilization. One lecture a week for 18 weeks.

Seminar: A weekly seminar for members of the department staff, graduate students and major senior students is held, at which important current botanical papers are discussed. Attendance and participation are required.

Collateral Reading: Extensive reading of botanical literature in English, German and French, designed to give the student a broad knowledge of the science, is required of all major students. Final examinations are based in part upon this reading course.

Thesis: Each major student is required to select a problem in plant pathology or physiology (in other branches at the discretion of the department) for original investigation, and the thesis must embody a distinct contribution to knowledge. An effort will be made to assign problems having some bearing on scientific and economic agriculture.

Minor Course. — For a minor a student may take such of the work offered by the department as seems best suited to his major course. In most cases no problem will be assigned.

Professor Osmun, Dr. Chapman, Associate Professor Anderson and Assistant Professor Clark.

Chemistry. — I. Major courses for the degree of master of science. Students will be required to take Courses 101, 108 to 114. In addition to this the requirements in the various thesis subjects are: —

Organic and Bio-Chemistry. — Courses 115 and either 105, 106 or 107, and 6 hours for one term selected from Courses 103 (*b*) and (*f*), and 104.

Analytical and Industrial Agricultural Chemistry. — Courses 116, 103 (6 hours), and 6 hours for one term selected from Courses 102, 104 to 107.

Physical Chemistry. — Courses 104, 117, and 6 hours for one term selected from Courses 102, 103, 105 to 107.

Agricultural Chemistry. — Courses 103 (6 hours), 118, and 6 hours for one term selected from Courses 102, 104 to 107.

The candidate must pass a final written and oral examination before the Department of Chemistry upon undergraduate Courses 1 to 80, inclusive, and upon all graduate work taken in chemistry by him.

II. Major course for the degree of doctor of philosophy. Students will be required to take Courses 101 to 114, and one course selected from 115 to 118. In addition, the student may be required to spend at least two terms or one semester at some other recognized institution pursuing graduate work in chemistry. The candidate must pass a final written examination before the Department of Chemistry, and an oral examination before the graduate staff, upon the whole field of chemistry, and must be especially well prepared in the lines of work covered by his research.

III. Minor course for the degrees of master of science and doctor of philosophy. Students will be required to take work totaling 54 to 78 hours. This may be selected from any of the undergraduate Courses 27 and 51 to 80, or any of the graduate courses for which the student is prepared. In addition, the candidate must pass a final written and oral examination before the Department of Chemistry upon the courses taken and upon undergraduate Courses 27 and 51 to 80.

The following is a list of the courses: —

101. *Inorganic Preparations.* — Laboratory. The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Ten to fifteen of the preparations given in Biltz's "Laboratory Methods of Inorganic Preparations" will be made by each student. Any term, 6 hours. Professor Anderson.[1]

102. *Advanced Inorganic Preparations.* — Laboratory. Continuation of Course 101. Any term, 6 hours. Professor Anderson.

103. *Advanced Analytical Chemistry.* — Laboratory. This course may be taken in part as follows: (*a*) electrolytic analysis, 6 hours; (*b*) ultimate analysis, 6 hours; (*c*) special analytical work to meet the needs of the individual student, 6 hours. In addition, parts of undergraduate Courses 61, 62, 76 and 77 may be taken, as follows: (*d*) fertilizers, 6 hours; (*e*) insecticides, 6 hours; (*f*) milk and butter, 6 hours. (*a*), (*b*), (*c*) may be taken any time; (*d*), (*e*), (*f*) must be taken at the time the undergraduate course is given.
Professor Wellington and Professor Peters.

104. *Advanced Physical Chemistry.* — Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; per cent. hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; critical temperature of carbon dioxide or sulphur dioxide; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; adsorption of iodine by charcoal; splitting of racemic glycerinic

[1] On leave of absence, 1917–18.

or racemic tartaric acids into their optical components. To each student separate work will be assigned. Any term, 6 hours. Professor ANDERSON.

105. *Advanced Organic Preparations.* — Laboratory. The preparation of compounds not included in Courses 51 and 52, such as the Kolbe synthesis of salicylic acid; benzophenone and Beckmann's rearrangement; rosaniline, malachite green, congo red, indigo and other dyes; synthesis of fructose; Grignard reaction. Barnett, Cain and Thorpe, Gatterman, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Any term, 6 hours. Professor CHAMBERLAIN.

106. *Advanced Bio-Chemistry.* — Laboratory. The hydrolysis of proteins and isolation of the amino acids; the study of milk, blood and urine; dietary and digestion studies. References: Abderhalden, Plimmer, Salkowski, Hawk, etc. To each student separate work will be assigned. Any term, 6 hours. Professor CHAMBERLAIN.

107. *Industrial Organic Chemistry.* — Laboratory. The preparation, on a large scale, of wood alcohol, acetic acid, ethyl alcohol, benzene and cellulose products, such as mercerized cotton and artificial silk. References: Molinari, Rodgers and Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Any term, 6 hours. Professor CHAMBERLAIN.

108. *Theoretical Chemistry.* — Lectures. The following topics are considered: the compressibility of the atoms; the structure of atoms; the electron conception of valence. First term, 1 hour. Given in 1917–18. Alternates with Course 109. Professor PETERS.

109. *Analytical Chemistry.* — A general survey of methods and technique covering processes commonly carried out in the laboratory. Gooch's Quantitative Analysis is used as a text. First term, 1 hour. Given in 1916–17. Alternates with Course 108. Professor PETERS.

110. *Organic Chemistry.* — Lectures. Some of the following topics will be considered both theoretically and industrially: alkaloids, synthetic dyes, essential oils, terpenes, rubber, etc.; the study of methods for carrying out general reactions; isomerism, tautomerism, condensation, etc. References, Cain & Thorpe, Cohen, chemical monographs, Lassar-Cohn, Heinrichs, Molinari. Second term, 1 hour. Given in 1916–17. Alternates with Course 111. Professor CHAMBERLAIN.

111. *Bio-Chemistry.* — Lectures. Some of the following topics will be considered both chemically and physiologically: fats, cholesterol, lecithin, carbohydrates, amino acids, proteins, urea, uric acid, purine bases, enzymes, fermentation, animal food and nutrition, photosynthesis. References, Monographs on Bio-Chemistry, Abderhalden, Plimmer, Haas & Hill, Lewkowitsch, Fischer, Euler, Mathews, Czapek. Second term, 1 hour. Given in 1917–18. Alternates with Course 110. Professor CHAMBERLAIN.

112. *Theoretical and Physical Chemistry.* — Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hin-

drances; stereoisomerism of other elements than carbon; molecular association; similarity between the compounds of silicon and carbon. Third term, 1 hour. Given in 1917–18. Alternates with Course 113.

Professor Anderson.

113. *Theoretical and Physical Chemistry.* — Lectures. Radioactivity; the application of physical chemistry to industrial chemistry. Third term, 1 hour. Given in 1916–17. Alternates with 112. Professor Anderson.

114. *Seminar.* — Conferences, reports or lectures. Three terms, twice a month, 1½ hours. Professor Lindsey.

115. *Research in Organic and Bio-Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor Chamberlain.

116. *Research in Analytical or Agricultural Industrial Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by the amount of work done.

Professor Wellington and Professor Peters.

117. *Research in Physical Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

Professor Anderson.

118. *Research in Agricultural Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor Lindsey and Experiment Station Associates.

Entomology (Major Courses, Ph.D. degree). — 1. *Morphology.* — Lectures on all, and laboratory work on a portion of the following subjects: embryology and polyembryology; transformations; histology; phylogeny; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogamy; chemistry of colors; coloration; luminosity; deformities; variation.

2. *Ecology.* — Lectures and laboratory work as above on the following subjects: dimorphism; polymorphism; protective devices; mimicry; psychoses; insect architecture; plant fertilization; insect products; geographical distribution; methods of distribution; migration; geological history; insects and disease; enemies of insects, vegetable and animal; duration of life; experimental entomology.

3. *Economic.* — Lectures and laboratory work as above on the following subjects: special methods of control; insecticides; special research; insect photography; methods of preparing illustrations; field work and life-history investigations; insect legislation; methods of record keeping.

4. *Systematic.* — Lectures and laboratory work as above on the following subjects: history of entomology; classifications and principles of classification; nomenclature and its rules; how to find and use literature; preparing indices; number of insects known and in existence; lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections; location of types.

5. Seminar; required readings; thesis.

All of these five courses are required of students taking a Ph.D. in entomology.

Minor Courses. — Such portions of the major courses as are most closely correlated with the other lines of work taken by the student and which can be completed in the time available.

Professor FERNALD, Professor CRAMPTON and Dr. REGAN.

HORTICULTURE. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now constitute the college Division of Horticulture, as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Prof. F. A. Waugh, head of the Division of Horticulture.

LANDSCAPE ARCHITECTURE (Major Course). — Every student before receiving his master's degree in landscape gardening must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. *Theory.* — The principles of esthetics as applied to landscape gardening.

2. *Design.* — The principles of pure design and their application in landscape and garden planning.

3. *Construction.* — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.

4. *Maintenance.* — Methods, organization, cost.

5. *Practice.* — Office work, drafting, estimating, reporting, charges, accounting.

Qualifications. — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

The minimum period of graduate study will be one and one-half years. At least one year of this time must be spent in residence at the college, and also one year must be spent in practice outside the college. The work done outside the college may be prescribed by the department, and must be fully reported to the department in writing. It is essential, further, that the candidate secure the written approval of his employers outside the college. The department may, at its discretion, require a longer period of study at the college or a longer apprenticeship outside the college.

Thesis or Project. — Each student before receiving the master's degree with a major in landscape gardening must present a satisfactory thesis or com-

plete project. A thesis will consist of a careful original study of some problem in landscape architecture, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of —

(*a*) Original surveys, including topography.
(*b*) Block plans, showing original design.
(*c*) A rendered plan or plans of the main features.
(*d*) Detailed working drawings.
(*e*) Estimates of cost.
(*f*) Complete report and letter of transmittal.

Minor Course. — Any student electing a minor in landscape gardening will be directed to take such courses from the regular catalogue list as may seem most suitable for him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

Prerequisite Work. — The undergraduate courses in the college known as Landscape Gardening 50, 51, 52 and 53, Drawing 25, 26, 27, Horticulture 27, 50, 51, and Mathematics 26 and 27 will be considered prerequisite to graduate work, and any student not having passed these courses or their equivalent will be required to make up such work without graduate credit. Courses known as Landscape Gardening 75, 76, 77, 78 and 79 are required and may or may not be accepted for graduate credit, at the discretion of the department.

Microbiology. — I. *Courses leading to the Degree of Doctor of Philosophy.* — 1. The candidate must present twenty-five credits from the undergraduate study as furnished in undergraduate Courses 50, 51, 52, 80, 81 or an equivalent before he can enter upon graduate study.

Note. — Twenty-five credits are required of undergraduates majoring in microbiology.

2. The candidate must pursue successfully the following special courses or their equivalent. These courses are designed to give a comprehensive survey of the fields indicated, and are arranged especially for graduate students.

175. Agricultural microbiology,	5 credits.
176. Agricultural microbiology,	5 credits.
182. Dairy microbiology,	5 credits.
183. Food microbiology,	5 credits.

Note. — Courses 175, 176, 180, 181, 182, 183 correspond in subject-matter with Courses 75, 76, 80, 81, 82, 83 of undergraduate study; the latter courses are elementary in nature, while the former are arranged for intensive advanced study of graduate character. Candidates will be required not only to perform the exercises of the above courses, but will be expected to assist in teaching the elementary classes covering the same theme as a part of graduate requirements.

3. It will be necessary to complete additionally the following courses or their equivalent, open only to graduate students: —

190. I. 1917. Studies in technique, as photomicrography, laboratory equipment and manipulation.[1]
5 to 10 credits. Assistant Professor ITANO.
151. II. 1918. Cytological and morphological studies and technique.[1]
5 to 10 credits. Professor MARSHALL and Mr. HOOD.
152. III. 1919. Physiological studies.[1]
5 to 10 credits. Assistant Professor ITANO.
177. II. 1919. Microbial studies in agriculture. Specific subjects.[1]
5 to 10 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.
181. II. 1920. Advanced sanitary or hygienic studies.[1]
5 to 10 credits. Professor MARSHALL and Assistant Professor ITANO.
150. I., II., III. Lectures and study of literature.[2]
10 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.
200. I., II., III. Research.[3] (Some microbiological problem related to agriculture.)
40 to 50 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.

The thesis prepared must be satisfactory to the department, and the graduate staff and the candidate must be ready to defend it at his public examination. Further, following the presentation of the thesis, the candidate must submit to a written examination covering the entire subject by the department and a public oral examination under the auspices of the graduate staff.

II. *Courses leading to the Degree of Master of Science.* — 1. Prerequisite studies, as in the case of the degree of doctor of philosophy (I., 1).

2. Special studies as represented by courses —

175. Agricultural microbiology, ... 5 or 10 credits.
176. Agricultural microbiology, ... 5 or 10 credits.
182. Dairy microbiology, ... 5 or 10 credits.
183. Food microbiology, ... 5 or 10 credits.

3. Courses designed for graduate students only.

150. I., II., III. Lectures and study of literature.
5 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.
200. I., II., III. Research.[3] (Some microbiological problem related to agriculture.)
15 to 25 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.

The thesis submitted must be satisfactory to the department and to the graduate staff.

The candidate will be required to take a written examination and an oral examination by the department.

III. *Minor work in microbiology* may consist of Undergraduate Courses 50, 51, 52, and one other course, designed to support his major work, from among Courses 175, 180, 181, 182, 183. He will also be required to pursue Graduate Course 150 through four terms (see II., 3, 150). In case the candidate has had some of these courses he will be required to take more advanced substitute courses. A written examination over the subject-matter covered will be given at the close of the work.

POULTRY SCIENCE (Major Course for the Degrees of M.S. and M.Agr.). — 1. *Reading.* — A review of the entire field of poultry literature, covering books, bulletins and special articles, is made, and a written report on one or more subjects required.

[1] Repeated every three years.
[2] Continues over three years, once each week.
[3] Distributed as may be most beneficial for research work. Time and credit by arrangement.

2. *Seminar.* — A critical review and a criticism of the more important experiments carried on at the various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc., besides a detailed study of some of the largest poultry projects in this country.

3. *Anatomy* (*Gross and Histological*), *Physiology and Surgery.* — This course requires a careful study of the anatomy and physiology of the fowl. Special attention is given to a study of those structures concerned with practical poultry problems. Instruction in surgical technique, adapted to fowls, may also be given.

4. *Breeding.* — The student will carry on such breeding experiments as time and facilities permit. He may also do work in connection with our regular experimental projects. A detailed study of the pertinent literature will be required. Animal Husbandry 5, or its equivalent, is a prerequisite.

5. *Feeding.* — A study of the relation of various foods and other substances to the morphology and physiology of the bird, with special reference to such subjects as egg production, feather form and structure, condition of flesh, bone, etc.

6. *Brooding.* — Studies will be made upon the relation between viability and rate of growth and the following topics: type of brooder, number of chicks in brood, ventilation, humidity, sanitation, exercise and weather conditions; also a comparison of natural methods with artificial methods of rearing chicks.

7. *Incubation and Embryology.* — A number of problems of a practical, scientific and mechanical nature relating to incubation are considered. The work in embryology is of an advanced nature dealing with its relation to morphogenesis and heredity, and presupposes an elementary knowledge of the embryology of the chick.

8. *Poultry Diseases and Sanitation.* — In this course a study is made of various problems in poultry sanitation, with particular reference to methods relating to the control and eradication of disease.

9. *Thesis.* — A thesis based on first-hand work on some problem in poultry biology or husbandry is required of all students working for the M.S. degree, and may be required of those working for the M.Agr. degree.

Note 1. — The postgraduate course presupposes all undergraduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 5, 6 and 7. At the discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

Note 2. — Practical poultry work may be required, but no credit will be given for such work.

Note 3. — Courses 1 and 2 are designed particularly for minors.

Rural Sociology. — Courses are offered in Rural Sociology as major or minor subjects for the degree of doctor of philosophy.

Candidates for the master's degree will be required to pass an examination in all courses offered by this department primarily for undergraduates, as shown in the departmental classification. In addition they will be required to select one or more of the divisions of the subject for intensive study and research, as indicated below.

A thesis showing the results of personal investigation on some particular topic or topics must be presented. The thesis must show familiarity with the

material bearing on the subject, ability in discovering and utilizing original sources, judgment in evaluating facts, evidences and authorities, originality and independence of thought. It must be a contribution in a very definite way to rural sociological thought.

Topics for Study and Research.

1. The rural community: —
 (*a*) Historical development.
 (*b*) Influence of modern conditions on family and community life.
 (*c*) Problems and methods in community organization.
 (*d*) Community planning in Massachusetts.
2. Origin and development of rural institutions: —
 (*a*) Scope, function and influence of educational institutions on rural social progress. Plans for betterment.
 (*b*) History of the development of the rural church, its problems and program for improvement.
 (*c*) The farm family, in its relation to religious, cultural, educational and social agencies. The relation of the standard of living to rural social progress.
3. Rural organization: —
 (*a*) The scope and function of rural organization in development of rural life.
 (*b*) Work of the national government in rural organization.
 (*c*) County and institutional work in rural organization.
 (*d*) Leadership in its relation to organization.
4. Rural government and rural law: —
 (*a*) Development of rural local government in New England and the west. Progress in efficient local self-government.
 (*b*) Relation of the State to the farmer, influence of the farmer in legislation, the organized ways and means by which the State aids the farmer directly.
 (*c*) Work of the national government in its relation to the social welfare of the farming people.
 (*d*) Agrarian legislation in the United States and Europe affecting rural social welfare.
5. Farmers' organizations: —
 (*a*) Social problems underlying farmers' organizations in reference to service and permanency.
 (*b*) Principles of organization.
 (*c*) History of farmers' organizations in the United States.
6. Rural social and sociological surveys: —
 (*a*) An intensive study of the place and function of statistical data in the sociological field, its evaluation and interpretation.
 (*b*) A critical study of social surveys of rural life and methods of survey, with a view to discovering the strength and weakness of each.
7. Social condition of the rural people: —
 (*a*) Origin and development of rural ideals.
 (*b*) The status of the rural people in relation to health, morality, crime, etc.
 (*c*) Problems of social psychology arising in rural life.

The course required for candidates offering a minor will be arranged after a conference with the director of the department, and will take into consideration the needs of the student in view of his previous preparation. The amount of time required of the student for his minor work will correspond with the requirements of the graduate school.

Veterinary Science. — Work is available in anatomy, hygiene, veterinary pathology, medicine, surgery, parasitology and other special lines or divisions of the subject.

Zoölogy. — Courses in zoölogy may be available as a minor for the degree of master of science and as a minor for the degree of doctor of philosophy. The nature of the work will necessarily vary according to circumstances, and may be intensive in a special field and correlated closely with the major work of the

student, or it may be of a more general character, depending on the student's needs or previous acquaintance with general zoölogical science. The time devoted to zoölogy as a minor for either of the above-named degrees may vary from 12 to 16 hours per week, pursued for a year and a half.

List of Students.

A list of the degrees conferred in the Graduate School, and of the students enrolled, is given in the general lists at the end of the volume.

THE SHORT COURSES

AND

THE EXTENSION SERVICE.

THE
JOHN CRERAR
LIBRARY

The Short Courses.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those who cannot come to the college for the regular agricultural courses. They furnish the student with instruction in modern accepted methods, and are designed to help the farmer and the housewife meet the present economic conditions. In the main, the instruction is given by the regular teaching force of the college, the same laboratories and equipment being used as in the regular college work. The short courses may be grouped as follows: —

A. Winter Schools.
 1. Ten Weeks' Course.
 2. Spring Beekeeping School.
 3. Apple Packing School.

B. Summer Schools.
 1. Summer School of Agriculture and Country Life.
 2. School for Rural Social Service.
 3. School for Library Workers.
 4. Boys' and Girls' Agricultural Camps.

Expenses of the Short Courses. — The expense of attending any of the short courses is approximately as follows: —

Registration fee (Ten Weeks' Course, Apple Packing and Summer School),	$5
Furnished rooms in private houses (per week),	$2 to $4
Board at college dining hall (per week),	$6 to $6.50
Board with private families (per week),	$7 to $8

A lunch counter is operated in connection with the dining hall; meals may be obtained there *à la carte* at very reasonable rates.

Students in each of the dairy courses must provide themselves with two white wash suits and caps for use in the practical dairy work. The cost in Amherst is about $1.25 for suit and cap.

Requirements for Admission to Short Courses. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic. Practical experience in farm, garden, orchard or greenhouse work is an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character. References are required, and these are investigated before applicants are accepted.

A. Winter Schools, 1918.

1. Outline of the Ten Weeks' Courses, December 31 to March 9. — The following courses are offered: —

1. Soil Fertility. Professor Beaumont. Three lectures a week.
2. Field Crops. Professor Jones. Two lectures and one two-hour laboratory period a week.

3. Type and Breeds of Live Stock. Professor McNutt. Three lectures and two two-hour judging periods a week.
4. Live Stock Feeding. Professor McNutt. Three lectures a week.
5. Animal Breeding. Professor McNutt. One lecture and one two-hour laboratory period a week.
6. Dairying. Professors Lockwood and Jamison. Five lectures and five two-hour laboratory periods a week.
7. Dairy Bacteriology. Professor Marshall. Two lectures a week, one two-hour laboratory period a week.
8. Animal Diseases and Stable Sanitation. Professor Paige. Two lectures a week.
9. Poultry Husbandry. Professors Graham and Payne. Five lectures and one two-hour laboratory period a week.
10. Farm Management. Mr. Peacock. Two lectures a week.
11. Farm Accounts. Mr. Peacock. Two two-hour laboratory periods a week.
12. Fruit Growing. Professor Sears. Three lectures and one two-hour laboratory period a week.
13. Market Gardening. Professor A. S. Thomson. Three lectures and two two-hour laboratory periods a week.
14. Landscape Gardening. Professor Harrison. Two two-hour laboratory periods a week.
15. Rural Improvement. Professor Waugh. Two lectures a week.
16. Floriculture. Professor Hecht. Five lectures a week and field trip.
17. Forestry. Professor Clark. Two lectures a week.
18. Botany. Professor Anderson. Two lectures a week.
19. Entomology. Dr. Regan. Three lectures a week.
20. Beekeeping. Professor Gates and Mr. Byard. Two lectures and one two-hour laboratory period a week.
21. Farm Mechanics. Professor Gunness. One lecture and two two-hour laboratory periods a week.
22. Rural Sanitary Science. Professor Marshall. Two lectures a week.
23. Problems of Marketing and Distribution. Professors Cance, Damon and Wilkinson. Two lectures a week.
24. Junior Club Work. Professor Farley. Two lectures a week.
25. Foods and Conservation. Mrs. Smith. Three lectures and two two-hour laboratory periods a week.

2. Spring Beekeeping School. — This itinerant school is held in Amherst once in three years, and extension schools are planned for different sections of the State during the intervening years. It is an intensive course, primarily for a limited number of practical beekeepers. The course, conducted by a strong staff of specialists, occupies seven hours daily for two weeks (Saturdays being devoted to excursion), and comprises lectures, laboratory practicums and field excursions. As this school was held at the college in 1916, it will be located in some other section of the State in 1918. Announcement of date and place will be made later. The course is under the direction of Burton N. Gates, associate professor of beekeeping.

3. Apple Packing School. — The work of this school, which is conducted by the Department of Pomology, is of a practical nature, and includes both box and barrel packing. Persons taking the course will become familiar with the various types of packs, and will receive sufficient practice to enable them to do good commercial packing. The 1918 school will probably be held in November, on dates to be announced.

B. Summer Schools, 1918.

1. The Summer School of Agriculture and Country Life. — The Summer School of Agriculture and Country Life of the Massachusetts Agricultural College will open July 1, 1918, for a term of four weeks. This will be the eleventh session of this Summer School, those of past years having been

highly successful. The experience of past years will aid in making material improvements in the session of 1918.

The work of the Summer School was designed originally for school teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again in 1918. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Practical courses will be offered for the benefit of such persons also.

1. Soil Fertility. Professor Jones. Five exercises a week.
2. Breeds and Livestock Judging. Professor McNutt. Five exercises a week.
3. Poultry Breeding and Management. Professor Payne. Four lectures and 1 laboratory period a week.
4. Dairying. Professor Jamison. Three lectures and two two-hour laboratory periods a week.
5. Fruit Growing. Professor Sears. Five exercises a week.
6. Vegetable Gardening. Professor Thomson. Five exercises a week.
7. Home and School Garden Supervision. Professor Hart. Three two-hour periods a week.
8. Boys' and Girls' Club Work. Professor Farley. A series of conferences.
9. Amateur Home and Flower Garden. Professor Hecht. Three lectures and two two-hour demonstration periods.
10. Trees and Shrubs. Professor Thompson. Five exercises a week.
11. Bird Life. Mr. Maynard. Five exercises a week.
12. Insect Life. Dr. Regan. Five exercises a week.
13. Plant Diseases. Professor Osmun. Five lectures a week first two weeks.
14. Beekeeping. Professor Gates. Five lectures a week last two weeks.
15. Food Conservation. Professor Chenoweth. Two lectures and three two-hour laboratory periods a week first two weeks.
16. Foods. Mrs. Smith. Three lectures and two demonstrations a week last two weeks.
17. Household Management. Mrs. Smith. Two hours a week.
18. Sewing. Mrs. French. Five hours a week.
19. Designs and Practical Arts (1). Mr. Ried. Five exercises a week.
20. Practical Arts (2). Mr. Ried. Five exercises a week.
21. Elementary Agriculture. Professor Jones. Five periods a week.
22. Organized Play and Recreation. Miss Fuller. Three lectures and four demonstrations a week.
23. Plays and Pageantry. Miss Hall. Five exercises a week.
24. Conservation of Health. Professor Marshall. Ten lectures.
25. First Aid and Home Nursing. Mrs. Pomeroy. Five exercises a week last two weeks.
26. Farm Management. Professor Foord. Five lectures a week first two weeks.

In order to meet the demand brought about by the present emergency, courses will be given in the 1918 Summer School in foods, canning, drying, storing, first aid and Red Cross work. A thorough course in garden supervision will also be offered.

A course of evening lectures on popular topics relating to the work of the school is a feature of the general program. Several able lecturers are engaged for this course each year.

The expenses are low. Amherst is situated in one of the most noted historical and educational centers in the country. Any one interested in problems pertaining to country life should not fail to attend. A descriptive circular can be had April 1, 1918.

2. The School for Rural Social Service. — This year special emphasis will be laid upon the group of courses given particularly for those who might be classed as rural social workers. These courses last year were primarily for clergymen, teachers and workers with women and girls.

The courses offered presented the rural problem from several standpoints, and served to show the relationships of the workers in the different lines to their respective fields and to the larger community problems which are constantly being presented to them.

Courses offered, 1918.

Home and school gardens.
Redirection of the rural school.
Gardening and canning.
The new rural school.
Health.
Organization for women and girls.
Practical agriculture.
Co-operation and marketing.
The new rural church.
Rural community organization.

Several of the courses offered in the regular Summer School of Agriculture and Country Life are also available to those who register in the School for Rural Social Service and pay the required fees.

3. School for Library Workers. — During the summer of 1917 a very successful school for library workers, of one week's duration, was held at the college. The work was planned especially for those librarians and library assistants in village and rural libraries, whose special training and experience have necessarily been limited. This school will again be offered in July, 1918.

The faculty of the summer schools for 1917 was as follows: —

Kenyon L. Butterfield, A.M., LL.D., President of the College.
William D. Hurd, M.Agr., Director of the Extension Service and Supervisor of Short Courses.
Andrew S. Thomson, A.M., Assistant Professor of Market Gardening, in charge of Summer Schools.
Charles R. Green, B.Agr., Librarian of the College.
F. Josephine Hall, A.M., Adviser for Women.
Laura Elizabeth Bell, Director of Physical Education, Amagansett, N. Y., Physical Education.
Anna L. Brown, M.D., Secretary for Hygiene, National Board, Y. W. C. A., Physical Education.
John L. Byard, Superintendent of Apiary, Beekeeping.
Walter J. Campbell, M.A., Director of County Work, Y. M. C. A. College, Springfield, Mass., Rural Sociology.
Anna M. Clark, County Secretary, Northeastern Field Committee, National Board, Y. W. C. A., Work with Girls.
William D. Clark, A.B., M.F., Professor of Forestry, Forestry.
Laura Comstock, Extension Professor of Home Economics, Home Economics.
Ethel Cutler, Secretary for Religious Work, National Board, Y. W. C. A., Story Telling.
George L. Farley, M.Sc., Supervisor, Junior Extension Club Work, Boys' and Girls' Clubs.
Agnes Burns Ferguson, M.D., Director of Playgrounds, Pittsburg, Pa., Organized Play.
Burton N. Gates, Ph.D., Associate Professor of Beekeeping, Beekeeping.
John C. Graham, B.Sc., Professor of Poultry Husbandry, Poultry Husbandry.
Ida E. Hall, LL.B., Waltham, Mass., Plays and Pageants.
Earl Jones, M.Sc., Assistant Professor of Agronomy, Soil Fertility.
William Chauncy Langdon, Pageant Master, M. A. C. Fiftieth Celebration, Community Drama.
Charles J. Maynard, Naturalist and Lecturer, West Newton, Mass., Ornithology.
John C. McNutt, B.Sc.Agr., Professor of Animal Husbandry, Animal Husbandry.
Ezra L. Morgan, A.M., Extension Professor of Local Community Organization, Community Organization.
Helen Norris, Extension Instructor in Agricultural Education, in charge of Girls' Camp.
William S. Regan, Ph.D., Instructor in Entomology, Entomology.
Frederick W. Ried, Director of Practical Arts, Framingham (Mass.) Normal School, Handicrafts.
Marie Sayles, B.S., Extension Instructor in Home Economics, Home Economics.
Fred C. Sears, M.Sc., Professor of Pomology, Pomology.

F. A. Cushing Smith, B.Sc., M.L.A., Extension Professor of Landscape Gardening, Assistant Civic Improvement.
Robert J. Sprague, Ph.D., Professor of Economics and Sociology, Sociology.
Mabel S. Ulrich, M.D., Special Lecturer, National Board, Y. W. C. A., Physical Education.
John T. Wheeler, B.S., Assistant Professor of Horticulture, Elementary Agriculture.
James Whiting, Head Gardener, Department of Floriculture, Floriculture.

C. Miscellaneous Courses.

1. Short Courses for Special Groups. — Plans are now under way to provide short courses at Amherst, lasting four or five days, for fertilizer agents, feed agents and dealers, milk inspectors, seed dealers, bankers and other groups desiring such instruction. Information concerning these may be obtained by writing the Supervisor of Short Courses.

2. Special Days for Foreigners. — Each year there are provided at the college special days for foreigners. Instruction is given in soil management, co-operation, American citizenship and history. This work for foreigners will be arranged at the college, or in different sections of the State.

3. Meetings of Organizations at the College. — It is customary for the various State organizations of fruit growers, poultrymen, breeders and others to meet for conventions and picnics at the college. Such gatherings are welcomed by the college authorities, and organizations are cordially invited to meet in Amherst. The Extension Service will assist in arranging programs and other forms of instruction and entertainment.

All requests for announcements or further information regarding any of the short courses should be addressed to the Supervisor of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

The Extension Service.

The Extension Service of the Massachusetts Agricultural College is an organized effort to carry systematic and dignified instruction to the thousands of people throughout the State who are unable, owing to various reasons, to take advantage of the regular courses offered at the college. It is in reality the "carrying of the college to the people of the State." Every department of the institution, in so far as the regular teaching and research work will permit, contributes what it can to this work. There is also a regular staff of extension workers whose business it is to present the instruction of the college to individuals and various educational organizations such as extension schools, granges, Y. M. C. A.'s, churches, boards of trade, etc., throughout the State. Because of the peculiar conditions which are presented to all agricultural workers this year the rôle played by the Extension Service assumes greater proportions than ever before. A large amount of effort is given on the part of the extension workers to the war emergency work in food production and the economy of the home. Extension work may be roughly classified under the following general heads: general administration; correspondence studies; itinerant instruction, which includes lectures and lecture courses, exhibits, demonstrations and extension schools; extension work through the various departments of the college, in which the extension specialist is responsible to the head of the department for the technique of the work and to the director of the Extension Service for its accomplishment; co-operative work of various kinds with the United States Department of Agriculture; and extension work through county, district and local agents. Some of the ways in which this is being done are briefly described below.

Courses given at the College.

1. Farmers' Week. — This week has become a very prominent feature of the agriculture of the State. Instruction is presented by means of lectures, demonstrations, exhibits, round tables and conferences, covering a period of five days. The regular college equipment is used, and the work of the college faculty is supplemented by lectures and demonstrations by eminent men and women from our own and other States. The 1918 program will be divided into 3 sections, as follows: —

1. Agriculture.
2. Horticulture.
3. Home Economics.

These sections take up the time from early morning until late afternoon, and in the evening there are lectures given by prominent men and women. Fruit, corn, live stock, dairy and poultry shows and other exhibits present the most recent improvements in these various lines of work that should be brought to the attention of the farmer who hopes to keep his work and equipment modern. No fee is charged.

2. Annual Beekeepers' Convention. — This convention is held during Farmer's Week. Illustrated lectures, practical demonstrations and commercial displays are important features of the convention. Meetings of State and county beekeepers' associations and of apiary inspectors also are scheduled at this time.

3. Polish Farmers' Day. — A special day is set aside in March of each year which is known as Polish Farmers' Day. There are hundreds of Polish farmers in the Connecticut valley, and this day represents a special effort on the part of the college to be of service to them. Instruction is given relative to the crops and animals in which these people are most interested, soil fertility problems, co-operation, American citizenship, Polish and American history, etc. The services of an interpreter make the day's exercises of added interest and value. It will be held on April 8 and 9, 1918.

4. Annual Conference of County Agents and Vocational Agricultural Instructors. — In December of each year a one-week conference of county agents and vocational agricultural instructors is held at the college. This is for the purpose of correlating the extension work throughout the State, and to enable the field workers to keep in up-to-the-minute touch with agricultural problems, methods and research as conducted in Massachusetts as well as other States in this particular section of the country. The next annual conference will probably be held during the third full week in December, 1918.

5. Poultry Convention. — In the preparation of our sixth annual poultry convention the wishes and needs of the poultrymen and women of the State will be the first and only consideration. It is not often that the poultry public has an opportunity to hear men of national reputation from different parts of the country, and it is such men that we secure for this occasion.

The special features of the program for 1918 will be as follows: —

1. Lectures by the best talent that can be secured.

2. Demonstrations in killing, picking, packing and preparation for retail trade.

3. Demonstrations in grading and judging market eggs.

4. Demonstrations in selection and mating both for utility and exhibition purposes.

5. Demonstrations with poultry equipment.

6. Poultry museum. Samples of feeds, equipment, diseased specimens, charts, etc.

7. A small poultry farm in Massachusetts. This will be made one of the special features of the program.

Program ready June 1. The convention will be held July 24, 25 and 26, inclusive.

6. Agricultural Camp. — During July, dates to be announced. These camps are arranged in order that boys from rural districts and small towns may receive some instruction in agriculture and clean, wholesome sports, and that they may have impressed upon them their responsibilities as coming members of society. Teachers, clergymen, Y. M. C. A. workers and county agents are especially urged to send boys who will be benefited by the instruction given at these camps.

The main purpose of these camps is fourfold: —

1. To interest the boy in agriculture and country life. This is the primary object.

2. To impress on the boy his responsibilities as a member of society.

3. To teach the boy clean, wholesome sports, recreation and proper spirit in competitive contests.

4. To demonstrate the value of a boys' camp as an educational factor.

The camps are under military discipline. Not more than forty-two boys — reservation being made for three from each county — will be taken at one time, therefore application should be made early. A succession of these camps, each lasting one week, will be arranged during July. The College feels it has a direct duty to the boys of the State whose inclinations draw them toward agricultural pursuits. In addition to instruction along agricultural lines there will be a well-balanced program of instruction in some of the vital problems of life, and periods will be devoted to athletics and other forms of recreation. The cost to each boy has, in the past, been $8 for the week. This fee helps defray the cost of maintaining the camp, meals, instruction, lectures and so forth.

The daily program consists of camp duty, flag raising, agricultural lessons, talks on hygiene and good citizenship, play and recreation, instruction in handicrafts and photography, evening camp fires, and lectures by men prominent in boys' work. The regular instructors of the college give practical talks on various agricultural specialties, these talks being followed by demonstrations and by inspection of the departmental equipment, such as the dairy, poultry plant, orchards, etc.

Features of the agricultural work are the stock-judging contests, corn-judging contests, operation of the Babcock milk test and similar specialties. The talks by the different instructors are made very practical, and the boys are given every opportunity to participate in the various lines of agriculture which are outlined.

During the past three years the third camp has been composed of the third prize winners in the State-wide boys' and girls' clubs, a separate camp being maintained upon the same general plan for the girl winners. This will undoubtedly be a feature of these camps in the future.

Opportunities are given for those interested to receive instruction under special teachers in basketry, photography, stock-judging, whittling, surveying and map reading, wireless telegraphy, wig-wagging, shop work, first aid, rope tying and splicing, seed testing, military drill, bird study, etc. Other features are the camp newspaper, minstrels and vaudeville, debates and mock trial and the camp circus.

7. Conference on Rural Organization. — This conference is held as a closing feature of the summer school each year. It takes up various problems of New England country life. Numerous State organizations co-operate with the college in providing the programs. Section meetings of various groups are held each forenoon, a general round-table discussion is held each afternoon, and lectures are delivered each evening by persons prominent in social and educational work. Many small group conferences are also arranged. This conference will follow immediately after the summer school.

Correspondence Courses. — The purpose of the correspondence courses is to furnish systematic instruction in those lines which will most benefit the general farmer, the dairyman, the fruit grower, the market gardener, the poultryman, the teacher, the homemaker, and all others who are interested in agricultural and country-life matters. It is the purpose to present up-to-date, accurate and concise information in such a manner and in such language that all who pursue the study may readily understand the work.

Courses offered. — A number of courses are in process of revision and several are being rewritten. During 1918 courses will be available as follows: —

1. Soils and Soil Fertility. Assistant Professor Jones.
2. Manures, Fertilizers and Soil Amendments. Assistant Professor Jones.
3. Field Crops. Assistant Professor Jones.
4. Farm Dairying. Professor Lockwood.
5. Fruit Growing. Professor Sears, Associate Professor Chenoweth.
6. Market Gardening. Assistant Professor A. S. Thomson.
9. Farm Accounts. Professor Foord.
10. Entomology. Dr. Regan.
12. Beekeeping. Associate Professor Gates.
13. Forestry. Professor Clark.
14. Shade Tree Management. Professor Osmun.
17. Poultry Husbandry. Professor Graham.
18. Home Economics. Extension Professor Comstock.

Methods of conducting the Work. — The best known methods of conducting correspondence course teaching are employed. Certain courses are based entirely upon text-books, others consist wholly of typewritten lectures, while others combine the two. If books are not required they are usually recommended.

The courses are designed primarily for the individual student. A new phase of the work, however, is the organization of study clubs or classes, meeting together periodically and using the courses as a basis of study. Correspondence in regard to this work is invited.

Enrollment of Correspondence Courses. — Students may enroll in the courses at any time between October 1 and June 1, and one year from the date of registration is allowed for the completion of each course. It has been found advisable to discontinue the courses through the summer months, as farmers and most other students cannot devote the necessary amount of time to the lessons during this season.

Expenses of the Correspondence Courses. — In order that none shall enroll except those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at $2 for each course except where the courses are divided, and it has been found advisable to charge $2 for each of the parts in these instances. The fee is payable strictly in advance, at the time the enrollment card is sent. When text-books are required the student purchases these.

Miscellaneous Short Courses. — For certain such courses, see page 155.

Lectures and Demonstrations. — The members of the faculty of the college are, when other duties will permit, available for lectures and demonstrations before granges, men's clubs, women's clubs, Y. M. C. A.'s, farmers' clubs, boards of trade and other organizations. A list of more than 40 lecturers and 200 subjects on various phases of agriculture, country life, economics, sociology, education, civic betterment and various scientific subjects has been prepared. Full courses of lectures or single lectures may be arranged.

Organizations arranging the lectures are asked to pay the traveling expenses of the lecturer, provided no admission fee is charged. When admission is charged the lecturer is entitled to a fee in addition to traveling expenses.

Extension Schools. — The extension schools are of two distinct types, the first being the Agricultural Extension School, dealing with the production side of farming and with the problems of the farm home; the second is the Extension School in Community Planning, having to do with the organization and

selling end of agriculture, and with instruction in the planning and carrying forward of various community activities.

It is also possible to arrange special extension schools along one particular line of work, such as fruit growing, dairying, etc.

Communities desiring an extension school make a written request, agreeing to defray all local expenses, such as the rent, heating and lighting of a suitable hall, and the board of the instructors during the school.

Agricultural Extension Schools. — The college sends a corps of instructors to a town for a five-day school of instruction. At present the following courses are offered: soil fertility, animal husbandry and dairying, fruit growing, poultry husbandry and vegetable gardening for the men, and a homemakers' course for the women. Morning and afternoon sessions only are held.

Community Planning Extension Schools. — These schools are arranged to extend over at least three days. The following courses are offered: education, agricultural organization, community program, civic improvement, farm management, town administration, public health, community recreation and homemaking. Morning, afternoon and evening sessions are held in these schools.

Educational Exhibits at Fairs and Other Shows. — The college cooperates with the managers of fairs, industrial expositions, corn shows, poultry shows, fruit shows and other exhibitions by making educational exhibits.

For outside work a large tent has been provided. In this about thirty cabinets containing educational material are arranged. A corps of lecturers and demonstrators accompany the exhibit and give practical instruction daily.

For inside work a space at least 40 by 60 feet is required for this exhibit. Smaller exhibits along special lines are sent to corn, fruit and poultry shows, milk shows, child welfare exhibits, and so forth.

The managers of fairs and exhibits are required to partially meet the cost of presenting these exhibits.

Extension Work in Special Fields.

Extension Work in Fruit Growing. — This work includes lectures and demonstrations on laying out and planting orchards, pruning, spraying, thinning, grading, packing and marketing fruits. Demonstration orchards, new and renovation plots, are established in different sections of the State, under a co-operative agreement between the college and the owners of land. Extension schools in fruit growing and fruit grading and packing are arranged on request. Visits to farms for advisory work are made, and correspondence on orcharding subjects is invited.

Extension Work in Animal Husbandry. — This work includes lectures, demonstrations and advisory assistance on subjects pertaining to cattle, horses, sheep and swine, as well as instruction in barn planning. Assistance in organizing dairy improvement associations and breeders' associations is given; stock-judging contests for boys are arranged at the leading fairs.

Extension Work in Dairying. — This includes lectures and demonstrations on the handling and care of milk, cream, butter and cheese; Babcock testing, dairy utensils and dairying manufactures. Educational campaigns may be arranged in different communities, seeking to educate producers, dealers and consumers as to the production and distribution of clean, safe milk.

Extension Work in Poultry Husbandry. — In addition to conferences at the college and visits to the plants of poultrymen, advice on general poultry management, diseases, mating, and laying out and planning buildings, this work includes co-operative work with other State and county agricultural and educational organizations, exhibits of poultry appliances at fairs and shows and other incidental phases.

Extension Work in Farm Management, Field Studies and Demonstrations. — This is carried on co-operatively between the college and the office of farm management of the United States Department of Agriculture at Washington. It consists of a study of farm conditions and farm management problems; instruction in keeping farm accounts and growing field crops; the use of fertilizer and lime; advice as to farm equipment, buildings, and so forth.

Extension Work in Rural Civic Planning. — This is carried on in connection with the Department of Landscape Gardening at the college. Assistance is rendered in various rural and village improvement enterprises, such as the planting and care of shade and street trees, the planning of playgrounds, school grounds, cemeteries, picnic grounds, the beautifying of waterfronts, the rearrangement and development of town commons and reservations of historic interest, and similar activities. Efforts are made to co-operate with local granges, men's and women's clubs, village improvement societies and like organizations.

Extension Work in Home Economics and Food Conservation. — This work includes lectures and demonstrations on subjects pertaining to household economy, dietetics and the preservation of foods. Instruction is carried on by means of extension schools in rural and urban communities, and is designed both for the housewife and for leaders and supervisors.

Junior Extension Work. — This is an organized effort to promote in the public schools of the State the study of agriculture and practical arts relating to country life. This is accomplished by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children, and lectures before granges, farmers' clubs and other interested organizations. The work of the agricultural clubs is under the direction of the superintendent of schools or some one recommended by him. Each town should hold an annual exhibit of products. Exhibits representing rather extensive districts are incorporated with the various agricultural fairs in the State. In this manner elementary instruction in agriculture is promoted by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College, which in turn co-operates with the State Board and the United States Department of Agriculture.

Extension Work in Home Economics. — The Extension Service, through its home economics workers, stands ready to assist in solving problems relative to the household in the same manner as it is endeavoring through other workers to aid in working out problems of the farm. The work, among other things, includes lectures and demonstrations, assistance in forming girls' clubs and home economics clubs for women, and co-operation with existing organizations in the matter of interesting young people in the proper care of the home.

Local Community Organization. — A number of communities in the State have appealed to the college for aid in bringing the various organizations in the community to a higher state of efficiency, in order that they themselves might take definite steps toward community development and

advancement. The college is now prepared to make scientific studies of communities which lead up, by means of surveys, to the organization of local committees to study the agricultural, educational, religious, transportation, recreation and civic needs of the communities. Several State organizations and some national organizations are usually brought in to aid in working out the plans presented by these committees. Conferences on community affairs are held upon request. The college acts merely in an advisory capacity, the communities themselves doing the actual organization work.

Library Extension Work. — This consists principally of loaning to public libraries of the State general collections of 10 to 30 books and bulletins on agriculture and related subjects. Special collections of smaller size on specified subjects, such as fruit growing, dairying, poultry, beekeeping, home economics, and so forth, are also sent out. These may be kept from four to eight weeks, according to the demand for them. The only expense to local libraries is transportation charge on the books both ways. The college library also supplies, upon request, information regarding books on agriculture and related subjects.

Agricultural Surveys. — To acquire definite information as to existing conditions in rural communities, to be used as a basis for further extension work, agricultural surveys are made. The different organizations and officials in the community, such as the town officers, superintendent of schools and teachers, clergymen, librarians and others, usually co-operate in making such surveys. The survey covers all phases of community life, including soil survey, farm management practices, and the educational, social, religious and recreational life. The inventory is made upon carefully prepared blanks.

Business Co-operation and Marketing. — This work has for its object the establishment of agriculture on a better business basis. Assistance is given in organization of co-operative buying and selling associations, the securing of rural credit, the adoption of better methods of marketing, the establishment of a better market for agricultural produce, and other lines of agricultural co-operation.

County or District Agricultural Agents. — The college is co-operating with farm bureaus and improvement leagues in all the counties of the State in carrying on extension work in agriculture and home economics. Residents of the county or district may, without cost, call upon the agent for assistance upon any agricultural subject. The work is being partly supported through the co-operation of the United States Department of Agriculture, the college and the county engaging the agent.

Advisory Work with Institutions and Individuals. — Special effort is made to comply with as many of the requests of State institutions and individuals who ask for advice on farm problems as possible. The force of instructors available for this work is at present insufficient to take care of all the demands. Special trips, including visits to a number of the various State institutions, are occasionally made by a group of specialists.

Publications of the Extension Service. — In addition to the regular circulars and bulletins which announce the various short courses and lines of work mentioned, publications giving timely information on agricultural subjects are issued. Large numbers of helpful circulars and bulletins are annually distributed. A series of bulletins especially for the farm woman is one feature of this work. Reports of the work of the Extension Service, dairy record blanks, farm account blanks, boys' and girls' club circulars, lists of books, and so forth, may be had upon request.

Co-operation with Other Organizations. — The aim of the Extension Service is to co-operate with existing organizations so far as possible. It is, therefore, glad to work with local organizations, and welcomes suggestions from town officers, local granges, farmers' clubs, women's clubs, Y. M. C. A.'s, Y. W. C. A.'s, boards of trade, village improvement societies, teachers, clergymen, librarians and others interested in agriculture and country life, as to needs and methods best adapted to the meeting of these needs.

Information by Correspondence. — Besides the activities mentioned, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry, which always receive the most careful attention from every department of the institution.

Pamphlets and bulletins are sent free to all who apply for them, and any who desire such help as has been mentioned should address the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

General Information.

THE
JOHN CRERAR
LIBRARY

General Information.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

Tuition.[1] — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $60 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.

All students entering the college for the first time as undergraduates or unclassified students are charged a matriculation fee of $5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

Dormitories and Board. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present, the price of board there is about $6 a week.

Expenses.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts, free; other citizens of the United States, $60 a year; foreigners, $120 a year.

	Low.	High.
Matriculation fee, first year,	$5 00	$5 00
Room in college dormitories or in private houses,	39 00	110 00
Board, $5 to $6 per week,	180 00	216 00
Laundry, 50 to 85 cents a week,	18 00	30 00
Military uniform, first year,	19 00	19 00
Laboratory fees,	5 00	20 00
Books, stationery and miscellaneous items,	14 00	25 00
	$280 00	$425 00

[1] This statement applies to those registering as regular or unclassified students.

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $300 and $425 per year.

Initial Charges.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee,	$5 00	–	–
Board (if at college dining hall) four weeks in advance,	24 00	$24 00	$24 00
Assessment for support of Social Union,	1 50	1 50	1 50
Laboratory fees,	5 00	5 00	2 00–10 00
Military uniform,[1]	19 00	–	–
Room rent (if in college dormitory),	–	–	12 00–20 00
Student tax for support of athletics,[2]	8 00	8 00	8 00
Student tax for support of nonathletic activities,[2]	2 50	2 50	2 50

[1] This cost is subject to modification from year to year.

[2] While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

Laboratory Fees.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present, the fees charged are as follows: —

Agronomy: —	Per Term.
Course 27, 3,	$1 50
Course 50, 1,	2 00
Course 51, 3,	2 00
Course 75, 1,	1 50
Course 76, 3,	1 50

	Per Term.
Animal husbandry: —	
Course 1, 1 and 2,	$1 00
Course 25, 1,	1 50
Course 26, 2,	1 50
Course 50, 2,	1 50
Course 78, 2,	1 00
Dairying: —	
Course 50, 1,	2 50
Course 51, 3,	2 50
Course 75, 2,	2 00
Course 76, 3,	3 00
Course 77, 1,	2 50
Farm administration: —	
Course 75, 2,	1 50
Course 76, 3,	1 50
Poultry husbandry: —	
Course 51, 1,	2 50
Course 53, 3,	3 00
Course 55, 3,	2 50
Course 76, 1,	2 00
Course 77, 1,	2 00
Rural engineering: —	
Course 25, 1,	1 50
Course 26, 2,	1 50
Course 76, 1,	1 50
Course 77, 2,	1 50
Course 78, 3,	1 50
Floriculture: —	
Course 50, 1,	2 50
Course 51, 2,	2 50
Course 52, 3,	2 50
Course 53, 1,	2 50
Course 75, 1,	2 00
Course 76, 3,	2 00
Course 77, 2,	2 50
Course 78, 3,	2 50
Forestry: —	
Course 50, 1,	2 00
Course 51, 2,	3 00
Course 75, 1,	4 00
Landscape gardening: —	
Course 50, 1,	3 00
Course 51, 2,	3 00
Course 52, 3,	4 00
Course 76, 2,	4 00
Course 77, 3,	4 00
Course 79, 3,	2 00
Market gardening: —	
Course 50, 3,	2 00
Course 75, 1,	3 00
Course 76, 2,	3 00
Pomology: —	
Course 75, 1,	3 00
Course 76, 2,	3 00

	Per Term.
Drawing: —	
Course 25, 1,	$3 00
Course 26, 2,	3 00
Botany: —	
Course 3, 3,	3 00
Course 25, 1,	3 00
Course 26, 2,	3 00
Course 50, 1,	3 00
Course 51, 2,	5 00
Course 52, 1,	4 00
Course 53, 2,	4 00
Course 54, 3,	4 00
Course 55, 1,	5 00
Course 56, 2,	5 00
Course 75, 1,	5 00
Course 76, 2,	5 00
Course 77, 3,	5 00
Course 78, 1,	5 00
Course 79, 3,	5 00
Course 80, 3,	5 00
Course 82, 2,	5 00
Course 83, 3,	5 00
Course 84, 2,	5 00
Course 85, 3,	5 00
Entomology: —	
Course 75, 3,	2 00
Course 76, 1,	3 00
Course 77, 2,	3 00
Course 78, 3,	3 00
Chemistry: —	
Course 1, 1,	3 00
Course 2, 2,	3 00
Course 3, 3,	3 00
Course 4, 1,	3 00
Course 5, 2,	3 00
Course 6, 3,	3 00
Course 25, 1,	4 00
Course 26, 2,	4 00
Course 27, 3,	5 00
Course 30, 3,	4 00
Course 51, 1,	5 00
Course 52, 2,	5 00
Course 60, 1,	4 00
Course 61, 2,	5 00
Course 62, 3,	5 00
Course 65, 3,	4 00
Course 76, 1,	5 00
Course 77, 2,	5 00
Course 80, 1,	5 00
Course 90, 2,	5 00
Course 91, 3,	5 00
Course 92, 2,	5 00
Course 93, 3,	5 00
Course 94, 2,	5 00
Course 95, 3,	5 00
Mathematics and engineering: —	
Course 27, 3,	2 00
Course 78, 3,	2 00

	Per Term.
Microbiology: —	
Course 51, 2 and 3,	$5 00
Course 52, 3,	5 00
Course 75, 2,	5 00
Course 76, 3,	5 00
Course 80, 2,	5 00
Course 81, 1,	5 00
Course 82, 1,	5 00
Course 83, 1,	5 00
Physics: —	
Course 27, 3,	3 00
Course 50, 1,	3 00
Course 51, 2,	3 00
Course 52, 3,	3 00
Veterinary science: —	
Course 78, 1,	2 00
Course 79, 1,	2 00
Course 80, 3,	2 00
Course 85, 1,	2 00
Course 86, 2,	2 00
Course 87, 3,	2 00
Zoölogy and geology: —	
Course 25, 1,	3 00
Course Zoölogy 27, 3,	3 00
Course 50, 1,	3 00
Course 51, 2,	4 00
Course 52, 3,	4 00
Course 53, 1,	4 00
Course 54, 2,	3 00
Course 55, 3,	3 00
Course 58,	2 00
Course 75, 1,	3 00
Course 76, 2,	3 00
Course 77, 3,	3 00
Course 78,	2 00
Course 79,	2 00
Rural journalism: —	
Course 53, 1,	2 00
Course 54, 2,	2 00
Course 55, 3,	2 00
Course 77, 1,	2 00
Course 78, 2,	2 00
Course 79, 3,	2 00
Course 80, 1,	2 00
Course 81, 2,	2 00
Course 82, 3,	2 00
Music (each course),	3 00

Rooms.

Students are expected, as far as possible, to occupy rooms in the college dormitories. Students who do not live in the college dormitories must secure rooms approved by the college. The assignment of rooms, and the general supervision of the housing of students, is in charge of the dean. The inspection of student quarters is in charge of the commandant. At the end

of each college year all unoccupied rooms will be thrown open for selection, and will be assigned to students according to classes. Freshmen will be assigned rooms according to the date of application.

Women students are expected to occupy rooms in the college dormitory and such houses or apartments as the college may provide. No woman student will be allowed to room in a private house without a special written permission from the dean.

Student Aid.

Self Help. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 and preferably $250 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and sixty or more students are employed at the dining hall.

Application for student labor should be made directly to Kenyon L. Butterfield, president of the college. Applicants are required to present statements from parent or guardian and from a public official or other responsible person of the town or city in which they reside, explaining the necessity of the applicant's need of assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

Special Notice to Needy Students. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each term. This rule is strictly adhered to, and no student will be allowed to complete his registration until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each term at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the term he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the president for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary.

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At

present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students: —

Management of the Infirmary.

Supervision.

1. The infirmary is under the *general supervision* of Prof. Charles E. Marshall who is designated as Supervisor of the Infirmary. Miss Florence Levensaler the resident nurse, is in *immediate* charge of the infirmary.

Use of Infirmary.

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at his suggestion. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health.

3. Students are urged to consult the physical director or the resident nurse immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee.

4. The infirmary fee will be at the rate of $1.50 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. A nominal charge will be made to out patients for miscellaneous treatment of a minor character.

Additional Expenses.

5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient: —

(*a*) *Nurses.* — In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(*b*) *Professional Service.* — If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(*c*) *Supplies.* — Special medical supplies prescribed by a physician or nurse will be charged to the patient.

(*d*) *Laundry.* — Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

B. COLLEGE ACTIVITIES.

General Exercises.

Chapel exercises are held two mornings each week. On Wednesday an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about six years ago. All students become members of the union by paying a small fee. The union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study; in the basement of this building there is also a game room for pool and billiards. In the fall and winter months the union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association is active both socially and religiously. A Catholic club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A dramatic club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and basket ball.

A rifle club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Massachusetts Collegian" published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture and horticulture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Clubs also exist in the Departments of French, Entomology, Floriculture, Landscape Gardening, Zoölogy and Agriculture Economics.

There has recently been organized a Collegiate Country Life Club, the membership of which is composed of faculty and students who are particularly interested in the study of country life problems.

A nonathletics student activities board, composed of alumni, faculty and students, has charge of the finances, schedules, etc., of the musical clubs, dramatic club and student publications.

C. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1914 were: —

Agriculture. — The Grinnell prizes, given by Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, for excellence in theoretical and practical agriculture. Three prizes, $25, $15, $10. The contest is open to those senior students whose record on the registrar's books shows an average standing of 80 or above for the technical work taken in the Divisions of Agriculture and Horticulture during the junior and senior years. Applicants should register with the head of the Division of Agriculture before noon, June 2, 1918.

Animal Husbandry. — The F. Lothrup Ames prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

Botany. — The Hills prizes, given by Henry F. Hills of Amherst, amount to $35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, $20; for the second best herbarium, $15. No collection deemed unworthy of a prize will be considered.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during his first two

years in college, has shown the greatest improvement in scholarship, character and example.

Public Speaking. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

Equipment.

Agricultural Education. — The courses in this department are planned primarily for those who are preparing to teach. The work is carried on by means of lectures, library and demonstrations. The department has an office, lecture room and a laboratory in the Veterinary Science building. The laboratory is equipped with a balance, dishes, jars, reagent bottles, test tubes, petri dishes, lenses, a Babcock test, a Wisconsin sediment test, Bunsen burner, hot and cold water, electricity, gas and other appliances for giving demonstration and practice lessons in Secondary Agriculture. There is also equipment for conducting children's gardens on the campus. Instruction in school gardens constitutes a part of the practice work of those training for the occupation of teaching. Some practice work in teaching is done in the grammar grades of the Amherst schools, and in the agricultural departments of Hopkins' Academy, and Smith's Agricultural School at Northampton. This department is also intimately related to the matter of recommending candidates for teachers' certificates. At least four courses in the department are required of students preparing for such certificate. The office is supplied with school and college reports, also a large number of pamphlets and bulletins relating to the subject of agriculture in the schools, courses of study, etc. See note relative to teachers' certificates, under major in Agricultural Education.

Agronomy. — The work in agronomy is carried on by means of lecture, laboratory and field work. The soil laboratories are located in the basement of Stockbridge Hall, and include an elementary laboratory with locker equipment for 200 men, and desk space for four divisions of 50 men each, and an advanced soil laboratory for the work of upper classes, with locker space for 80 men. This laboratory is also equipped with balance room, centrifuge room, steam ovens and moisture cabinets. There is also a workroom attached, equipped with power for grinding soils, fodders and the like.

The crop laboratories are located on the second floor of Stockbridge Hall, the room for seed study being at the south end and allowing for sections of 50 men each. The laboratory for cereal and forage crop work is at the north end of the building, and has locker equipment for 64 men. This laboratory is equipped with large steam ovens, constant temperature electric ovens, Brown-Duval moisture apparatus and ovens for seed germination. Attached is a balance room and also a storeroom; while on the fourth floor of Stockbridge Hall is a room equipped for the storage of seed corn, grains and grasses.

Animal Husbandry. — An accurate and definite knowledge of the market types and grades, and of the various breeds of live stock, is fundamental to the work in this department. The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180, and which is fully adapted to the requirements. There are upwards of 125 head of dairy cattle of various ages available for class-room work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Yorkshire pigs are maintained. The college possesses pure-bred Percherons and French coach horses besides many work teams of different types, which are available for class-room purposes. A set of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different foodstuffs available for the use of the New England farmer, are included in the equipment for this work. An excellent set of upward of 250 lantern slides, portraying the leading prize-winning, producing and breeding animals of the leading breeds, — horses, cattle, sheep and swine, — belongs to this department, and is regularly used in instructional work. This equipment is being added to from time to time as funds are available.

Botany. — The Department of Botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for freshman and sophomore work, and one for junior and senior work; a laboratory for plant physiology, which is well supplied with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc.; and three rooms specially fitted for graduate students. The experiment-station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experimental work and for housing material often needed for instruction.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with modern compound microscopes, dissecting microscopes, microtomes and other apparatus, and a large series of charts. In addition to a physiological laboratory the basement contains a seed and soil room, and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe and other tools and appliances. The herbarium contains about 18,000 sheets of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and over 20,000 specimens of fungi.

Chemistry. — The college Department of Chemistry occupies the entire building previously known as the "old chapel." The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to organic, physiological and physical chemistry, and qualitative analysis. The second floor is occupied by the general lecture room, by offices for the several members of the staff and by laboratories for analytical chemistry. The third floor has been fitted for work in general chemistry,

and has desk room and hoods sufficient to accommodate 90 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 56 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

Dairying. — The dairy work is given in Flint Laboratory, a new building designed for the dairy department. It contains large, well-lighted, sanitary and well-equipped laboratories. The equipment is new and of the best types of market milk and farm dairy machines.

Dining Hall. — Draper Hall, a brick colonial building equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college. The building contains a limited number of rooms for young women students.

Drawing. — The class in drawing occupies a room on the second floor of Wilder Hall. It is equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

Entomology. — *General Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped, and it will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room chemical desks and apparatus provide opportunities for the determination of the impurities and adulterations of insecticides. As the insectary of the Massachusetts Agricultural Experiment Station is in the

same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

Entomology. — *Beekeeping.* — For this work the main office, museum and lecture rooms are in the entomological building. There is also an apiary covering approximately two acres which will consist of about fifty colonies of bees in various types of hives and maintained for the several practical and experimental purposes. The apiary also includes a collection of nectar-yielding plants representative of the native flora as well as of the more important nectar sources from other localities. Especial opportunity is therefore given for a study of this fundamental problem of forage. Upon the apiary site is an eight-room building (the first in the world erected exclusively for teaching beekeeping) modeled to meet both the requirements of teaching and of a practical apiary. This building contains a boiler room, capacious wintering cellar, wax extraction room, general carpenter and work shop, laboratory, office, honey extraction room and stock room. The beekeeping equipment also includes an unexcelled collection of apicultural implements, natural history specimens and other curiosities. Practically every device used in American apiculture is available, it being the aim of the department to procure new inventions and implements as fast as they appear for the purpose of study and comparison. Available to the students is a private library of apicultural literature consisting of upwards of 900 volumes and papers, possibly the most complete collection in the country. This entire equipment is acknowledged unique in model and in completeness for the United States and for the world.

Farm Administration. — The college farm of 250 acres is under the general supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

Floriculture. — The Department of Floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a Department of Floriculture better equipped than this. There has been erected a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent speci-

mens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The Department of Forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distances of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects. The recent designation of Mt. Toby as a forest reservation provides more than 700 acres of forest, representing nearly every forest growth within the State.

Geology. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes. The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

Heating, Lighting and Power. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop and well-equipped carpenter shop.

Landscape Gardening. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

Library. — The library — stack room, reading room and office — occupies the entire lower floor of the Chapel-library building. It contains about 56,090 volumes and a large number of bulletins, farm papers and other material, which is being put into good working order as fast as possible. Works on agriculture, horticulture, botany, entomology and the various sciences predominate, but literature, history and sociology are well represented and receive

due attention. The reading room provides a good variety of popular and technical periodical literature, encyclopedias and general reference books.

The library is being reclassified and recatalogued in order to make the splendid material accessible and of the greatest working value. Every effort is being made toward developing the college library into a vital intellectual center, of equal value to every student, teacher and teaching department on the college campus. Consequently only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced. An agricultural reference library is maintained in Stockbridge Hall, and department libraries are also maintained in some of the other buildings on the campus.

Occasional lectures are given to regular and short-course students in order to make the best use of the library equipment. Emphasis is laid upon the card catalogue, periodical indexes, bibliographies and guides, and the large collections of United States Department of Agriculture and experiment station literature.

Library hours are from 7.30 A.M. to 9.30 P.M. every week day, and from 9 A.M. to 1.30 P.M. on Sundays in term time. Shorter hours prevail during vacation.

Market Gardening. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and laboratory particularly equipped for market gardening. A good library of works on vegetable gardening is available.

Mathematics and Civil Engineering. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Microbiology. — The department now occupies a newly erected building, and has at command laboratories, research rooms, offices and class-rooms, of thoroughly modern completeness.

Military Science. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

Physical Education. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The main floor is used for basket ball, indoor baseball and hand ball. The gallery has been fitted up as a special exercise and gymnastic room, and is equipped with modern developing apparatus, including parallel bars, horses, bucks, chest weights, dumb-bells, Indian clubs and striking bags. An outdoor board track enables students to secure track practice through the winter, and two ice hockey rinks give ample opportunity for hockey practice. Credit is given to all students taking part in outdoor activities. "Treks" are held twice a week, and whenever possible snowshoe and skiing hikes are also held. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a shower-room. The gymnasium classes are held the last two hours in the morning and the last two hours in the afternoon, but students may use the gymnasium at other times for exercise purposes by arrangement with the department. The regulation costume for class exercise consists of a white track suit and white rubber-sole shoes.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Pomology. — The Department of Pomology has 45 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. There are also two commercial vineyards, and a smaller one in which are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples, plums, pears and peaches, in natural colors. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1916–17, for instance, apples for class use were received from Idaho, Missouri, Utah, Washington, Maine, Connecticut, Pennsylvania, Montana, Minnesota, Nebraska, Kentucky, Iowa, Wisconsin, Michigan, New York, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrus fruit from Florida and Texas. From the college fruit plantations the following

fruits were available: grapes, fifty varieties, representing three native American species and several hybrids; twenty varieties of peaches, twenty varieties of pears, twenty-five varieties of plums, one hundred varieties of apples.

Poultry Husbandry. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar, 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, cramming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; a combination laying, testing and breeding house, 18 by 72, for experimental purposes, and a model laying house, 18 by 30, for 100 hens; the 6 old experiment-station buildings, each 12 by 18 feet, to be used as breeding houses; 14 colony houses; 8 growing crops; a manure shed, 14 by 18 feet; and an oil house, 10 by 12 feet. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chickens, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

Public Speaking. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests offer a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollegiate contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

Rural Engineering. — This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings. A set of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The rural engineering shop building is a one-story structure 68 by 126 feet. The carpenter shop in this building is fitted with benches fully equipped with tools for each student. A saw table is available for getting out material. The general repair shop is equipped with forges, benches, a drill press and grinders. The laboratory for farm machinery and farm motors is equipped with a complete line of field machines, gasoline engines and pumps. A small dynamo and switchboard are used in the study of farm-lighting systems.

The work on the small field machines is given in the basement of Stockbridge Hall, and the work on steam engines and steam heating is given in Flint Laboratory.

Rural Journalism. — The news-room, or laboratory, for the courses in rural journalism, is equipped with typewriting machines, copy tables, representative newspapers, reviews, agricultural papers, and trade journals concerning journalism and writing, selected books on journalism, reference books, and a considerable "morgue" of indexed pamphlets, monographs and clippings on farming, rural life and rural industry, contemporary events, etc. (loan collection). The news-room and offices are in the recently completed Stockbridge Hall, near the division library of the Division of Agriculture.

Veterinary Science. — The department of Veterinary Science occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the Departments of Entomology and Zoölogy-Geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 3 floor cases with space for 9 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 p.m. on Saturdays, and on other week days from 3 to 6 p.m. The curator is Professor Gordon.

List of Awards and Prizes, 1917.

Due to the early closing of college in 1917, no contests were held for the Grinnell prizes, the Hills botanical prizes or the public speaking prizes.

General Improvement. — The Western Alumni Association prize, given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example, $25. Awarded to William Mather, 1919.

Military Honors. — The following-named cadet officers have been granted the military diploma, and have been reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts as being efficient in military science and tactics and graduating therein with highest honors: —

Cadet Col. Oliver Simeon Flint.
Cadet Maj. Walter Adams Mack.
Cadet Maj. Almon Whitney Spaulding.
Cadet Maj. Lewis Taylor Buckman.
Cadet Capt. Charles Henry Hagelstein.
Cadet Capt. Harold Barnard Pierce.
Cadet Capt. William Saville, Jr.
Cadet Capt. Albert Briggs Loring.
Cadet Capt. Monsell Henry Davis.
Cadet Capt. William Raymond Irving.
Cadet Capt. Philip Rodney Babcock.

Secretaries of Alumni Associations.

Associate Alumni of the Massachusetts Agricultural College.
Secretary: Dr. Charles A. Peters, 1897, Amherst, Mass.

Alumni Secretaries' Association of the Massachusetts Agricultural College.
Secretary: Ralph J. Watts, 1907, Amherst, Mass.

Alumni Club of Massachusetts.
Secretary: Edward C. Edwards, 1914, 50 State Street, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
Secretary: Robert S. Fay, 1913, Monson, Mass.

Massachusetts Agricultural College Club of New York.
Secretary: Walter L. Morse, 1895, Grand Central Terminal, New York.

Massachusetts Agricultural College Club of Washington, D. C.
Secretary: G. A. Billings, U. S. D. A., Office of Farm Management, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
Secretary: Theodore J. Morean, 1912, 815 Steinway Hall, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
Secretary: Thomas F. Hunt, 1905, Berkeley, Cal.

Massachusetts Agricultural College Club of Hawaii.
President: Allen M. Nowell, 1897, Honolulu, T. H.

Massachusetts Agricultural College Club of Worcester County.
Secretary: Charles H. White, 1909, 11 Foster Street, Worcester, Mass.

Massachusetts Agricultural College Club of Marlborough.
Secretary: William L. Howe, 1908, Marlborough, Mass.

Massachusetts Agricultural College Club of Connecticut.
Secretary: Herbert J. Baker, 1911, Storrs, Conn.

Class Secretaries.

Class of —	Secretary.	Secretary's Address.
1871	E. E. Thompson,	5 Jacques Avenue, Worcester, Mass.
1872	F. E. Kimball,	17 Harvard Street, Worcester, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	D. G. Hitchcock,	Warren, Mass.
1875	P. M. Harwood,	Room 136, State House, Boston, Mass.
1876	C. Fred Deuel,	Amherst, Mass.
1877	Atherton Clark,	231 Waverley Avenue, Newton, Mass.
1878	C. O. Lovell,	201 Darke Block, Regina, Saskatchewan, Can.
1879	R. W. Swan,	41 Pleasant Street, Worcester, Mass.
1880	Alvan L. Fowler,	413 Federal Building, Philadelphia, Pa.
1881	J. L. Hills,	59 North Prospect Street, Burlington, Vt.
1882	G. D. Howe,	38 Whittier Avenue, Springfield, Mass.
1883	J. B. Lindsey,	Amherst, Mass.
1884	E. A. Jones,	New Canaan, Conn.
1885	E. W. Allen,	1923 Biltmore Street, Washington, D. C.
1886	Winfield Ayres,	616 Madison Avenue, New York City.
1887	F. H. Fowler,	Shirley, Mass.
1888	H. C. Bliss,	14 Mechanic Street, Attleboro, Mass.
1889	F. W. Davis,	85 Colberg Avenue, Roslindale, Mass.
1890	David Barry,	398 Walnut Street, Newtonville, Mass.
1891	H. T. Shores,	177 Elm Street, Northampton, Mass.
1892	H. M. Thomson,	Amherst, Mass.
1893	F. A. Smith,	Hathorne, Mass.
1894	S. F. Howard,	Northfield, Vt.
1895	E. A. White,	Ithaca, N. Y.
1896	A. S. Kinney,	South Hadley, Mass.
1897	C. A. Peters,	Amherst, Mass.
1898	W. S. Fisher,	Peace Street Grammar School, Providence, R.I.
1899	Herbert W. Dana,	9 Oliver Street, Salem, Mass.
1900	E. K. Atkins,	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass.
1902	H. L. Knight,	1420 Buchanan Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	East Holliston, Mass.
1905	A. D. Taylor,	1900 Euclid Avenue, Cleveland, Ohio.
1906	Richard Wellington,	2314 Scudder Street, St. Paul, Minn.
1907	Clinton King,	31 Elm Street, Springfield, Mass.
1908	S. J. Wright,	39 Wall Street, Norwalk, Conn.
1909	O. B. Briggs,	1011 Fidelity Building, Baltimore, Md.
1910	F. L. Thomas,	Auburn, Ala.
1911	L. M. Johnson,	Newtown, Conn.
1912	F. S. Madison,	East Greenwich, R. I.
1913	B. W. Ellis,	575 Main Street, South Weymouth, Mass.
1914	L. Ernest Smith,	Pittsford, Vt.
1915	P. F. Whitmore,	Sunderland, Mass.
1916	Perez Simmons,	34 Boylston Street, Pittsfield, Mass.
1917	John Dizer,	– – –

Degrees Conferred and Roll of Students.

Degrees Conferred — 1917.

Master of Science (M.Sc.).

Bales, Harold Campbell, South Deerfield, Mass., Dartmouth College, A.B.
Chapin, Edward Albert, Springfield, Mass., Sheffield Scientific School, Ph.B.
Cobb, J. Stanley, Groton, N. Y., Cornell University, B.Sc.
Doran, William Leonard, North Dartmouth, Mass., Massachusetts Agricultural College, B.Sc.
Fish, Ernest Ellsworth, Wyalusing, Pa., Pennsylvania State College, B.Sc.
Merkle, Frederick Grover, Amherst, Mass., Massachusetts Agricultural College, B.Sc.
Mutkekar, Satwaji Gundoji, Belgaum, India, Poona Agricultural College, B.Agr.
Vinal, Stuart Cuningham, East Weymouth, Mass., Massachusetts Agricultural College, B.Sc.

Bachelor of Science (B.Sc.).

Babcock, Philip Rodney, ... Lynn.
Behrend, Oswald, ... Natick.
Bell, Alfred Whitney, Jr., ... West Newton.
Blake, Ralph Cedric, ... Wollaston.
Boles, Robert Stewart, ... Dorchester.
Bonn, Wesley Copeland, ... Grafton.
Booth, Alfred, ... Campbell Hall, N. Y.
Boyce, Harold Prescott, ... Haverhill.
Buckman, Lewis Taylor, ... Wilkes-Barre, Pa.
Buttrick, David Herbert, ... Arlington.
Carruth, Glenn Howard, ... Orange.
Chamberlin, Frank Shirley, ... Framingham.
Clough, Charles Henry, ... Dedham.
Cross, Walter Irving, ... Hingham Center.
Curtin, Charles Warren, ... Newton.
Davis, Monsell Henry, ... Orange, N. J.
Day, James Harold, ... Hatfield.
Dempsey, Paul Wheeler, ... Dorchester.
Dickey, Harold Gammell, ... Dorchester.
Dillon, Thomas Stevenson, ... West Warren.
Dizer, John Thomas, ... East Weymouth.
Duffill, Edward Stanley, ... Melrose Highlands.
Dunham, Henry Gurney, ... West Bridgewater.
Edwards, Franz Gill, ... Beverly.
Elliot, Ralph William, ... Chartley.
Everbeck, George Charles, ... Boston.
Fearing, Ralph Watson, ... Dorchester.
Fellows, Katharine Adelheid, ... Northampton.
Fisher, George Basil, ... Millbury.
Flagg, Wayne McCrillis, ... Mittineague.
Flint, Oliver Simeon, ... Lowell.
Goldstein, Maurice, ... Lynn.
Graham, Leland Jenkins, ... Amherst.
Grayson, Emory Ellsworth, ... Milford.
Gurshin, Carl Alfred, ... Lynn.
Hagelstein, Charles Henry, ... Dorchester.
Harlow, Frank Edward, ... Malden.
Harlow, Paul Goodhue, ... Malden.
Henninger, Roswell Woodward, ... Williamsport, Pa.
Higginbotham, Harry, ... Taunton.
Holden, Richard Lynde, ... Haverhill.

Holder, Ralph Clifton,	Farmington, N. H.
Hubbell, Franklin Homer,	Westport, Conn.
Irving, William Raymond,	Taunton.
Kelsey, Edmund Dean,	Amherst.
Kelsey, Lincoln David,	West Hartford, Conn.
Kinsman, Alfred Oberlin, Jr.,	Merrimac.
Larson, Frederick Christian,	Everett.
Latham, Paul Walker,	Norwichtown, Conn.
Lawrence, Milford Robinson,	Falmouth.
Light, Brooks,	Brookline.
Loring, Albert Briggs,	Nantasket Beach.
Lydiard, Harry Crowther,	Hartford, Conn.
Mack, Walter Adams,	Springfield.
MacLeod, Daniel Johnston,	Wakefield.
Marchant, Horace Greenough,	Cambridge.
Mayo, Frank Willard,	Houlton, Me.
Mayo, William Irving, Jr.,	Framingham.
McNamara, Michael Joseph,	Stoughton.
Merrill, Dana Otis,	East Pepperell.
Nash, Herman Beaman,	Amherst.
Nelson, John Brockway,	Newburyport.
Noyes, Samuel Verne,	Georgetown.
Pierce, Harold Barnard,	Hartford, Conn.
Pratt, Harold Arthur,	Shrewsbury.
Quimby, Charles Frederick,	Cape Neddick, Me.
Randall, Earle MacNeill,	Winchester.
Richardson, Lewis Elmer,	Rockville.
Rodger, Raymond Miller,	Everett.
Rogers, Roland Winsor,	Braintree.
Rorstrom, Hans Alfred,	Boston.
Ross, Louis Warren,	Boston.
Saidel, Harry Samuel,	Worcester.
Sargent, George Leonard,	Merrimac.
Saunders, William Putnam,	Lawrence.
Sauter, John Martin,	Turners Falls.
Saville, William, Jr.,	Waban.
Schaefer, Leonard Charles,	Holyoke.
Schwab, Andrew Nathan,	Yalesville, Conn.
Selkregg, Edwin Reimund,	Northeast, Pa.
Smith, Herbert Dwight,	Amherst.
Smith, Richard Woodworth,	Pittsfield.
Spaulding, Almon Whitney,	Newton Highlands.
Squires, Paul Revere,	Belchertown.
Stearns, Carlton McIntyre,	Melrose.
Stiles, Albert Ralph,	Arlington Heights.
Stowell, Harold Thurber,	Amherst.
Thayer, William Wallace,	Somerville.
Tuthill, Samuel Fuller,	Mattapoisett.
Upson, Everett Langdon,	New Britain, Conn.
Walbridge, Henry Blood,	Bennington, Vt.
Warner, Merrill Pomeroy,	Sunderland.
Warren, Harold Manson,	Melrose.
Warren, James Joseph,	North Brookfield.
Webster, Frank Cedric,	Harvard.
Westman, Robert Clayton,	Roslindale.
Whitcomb, Warren Draper,	Waltham.
Whitney, Harold Tichenor,	Mount Vernon, N. Y.
Whitney, Joseph Fradley,	Westminster.
Wies, Calmy,	Malden.
Wilber, Charles Raymond,	Walpole.
Wilcox, Timothy Palmer,	West Andover.
Williams, Arthur Franklin,	Sunderland.
Williams, Herbert Clifton,	South Hadley Falls.

Roll of Students.

Graduate Students.

Allen, Harry W., ... Amherst.
B.Sc., Massachusetts Agricultural College.

Bourne, Arthur I., ... Amherst.
A.B., Dartmouth College.

Cheplin, Harry A., ... Johnstown, Pa.
B.S.A., Syracuse University.

DeVault, Samuel Henry, ... Amherst.
A.B., Carson-Newman College.
A.M., University of North Carolina.

Dougall, Robert, ... Pretoria, Transvaal, S. A.
B.S.A., McGill University.

Fagan, Frank N., ... State College, Pa.
B.Sc., Ohio State University.

Gordon, Thomas B., ... Lexington, Ky.
B.S.Agr., University of Kentucky.

Hompe, Louise, ... Auburn, N. Y.
B.A., Smith College.

Hood, Egerton Gibson, ... Amherst.
B.S.A., Toronto University.

Jones, Linus H., ... Milford.
B.Sc., Massachusetts Agricultural College.

Lieber, Conrad H., ... Jamaica Plain.
B.Sc., Massachusetts Agricultural College.

MacNeil, Ralph Langdel, ... Amherst.
B.Sc., Massachusetts Agricultural College.

Martin, John Elmer, ... Mounds, Okla.
B.S., Oklahoma Agricultural and Mechanical College.

Morgan, Ezra Leon, ... Amherst.
A.B., McKendree College.
M.A., University of Wisconsin.

Mutkekar, Satwaji Gundoji, ... Belgaum, India.
B.Agr., Poona Agricultural College.
M.Sc., Massachusetts Agricultural College.

Neill, James, ... Clarion, Pa.
B.S., Alleghany College.

Pauley, William C., ... Lafayette, Ind.
B.Sc. in Agr., Purdue University.

Peacock, Walter Miller, ... Amherst.
B.Sc., Cornell University.
M.S.A., Cornell University.

Pontius, Byron E., ... Amherst.
B.S. in Agr., Ohio State University.

Porter, Bennet Allen, ... Amherst.
B.Sc., Massachusetts Agricultural College.

Purington, James A., ... Hopkinton, N. H.
B.Sc., New Hampshire College of Agriculture.

Ray, George Burrill, ... Hingham.
B.Sc., Massachusetts Agricultural College.

Root, Irving C., ... Kansas City, Kan.
B.Sc., Kansas State Agricultural College.

Serex, Paul, Jr., ... Amherst.
B.Sc., Massachusetts Agricultural College.
M.Sc., Massachusetts Agricultural College.
Stewart, Lloyd Leland, ... Amherst.
B.Sc. in Agr., Purdue University.
Thompson, W. Bradley, ... Orange, N. J.
A.B., Williams College.
White, Donald, ... Wakefield.
A.B., Harvard College.
Wildon, Carrick E., ... Melrose Highlands.
B.Sc., Massachusetts Agricultural College.
Wood, Elwin G., ... Big Fork, Mont.
B.Sc., Washington State College.

CLASS OF 1918.

Additon, Elizabeth Emery,	Newton Center,	Draper Hall.
Babbitt, George King,	Washington, D. C.,	14 South College.
Baker, Henry Raymond,[1]	Amherst,	West Street.
Barton, George Wendell,	North Sudbury,	3 South College.
Boyd, Robert Lucius,[1]	East Lynn,	1 South College.
Bruce, Walter Griffith,	Stafford Springs, Conn.,	21 Fearing Street.
Buchanan, Walter Gray,	Chicopee,	97 Pleasant Street.
Canlett, Franklin Harwood,	Bedford,	36 North Prospect Street.
Carlson, Fred Albert,	Pittsfield,	84 Pleasant Street.
Carter, Thomas Edward,	Andover,	6 South College.
Chapman, John Alden,	Salem,	Phi Sigma Kappa.
Clark, Stewart Sandy,	Holyoke,	Chemistry Laboratory.
Cotton, Elwyn Page,	Woburn,	2 North College.
Davis, Dwight Shaw,	Woburn,	3 South College.
Edes, David Oliver Nourse,	Bolton,	Mathematics Building.
Emmerich, Louis Philip,[1]	Paterson, N. J.,	Q. T. V. House.
Foley, William Albert,	Palmer,	Alpha Sigma Phi.
Foster, Roy Wentworth,	Lynn,	Lambda Chi Alpha.
Goodwin, William Irving,[1]	Bradford,	Lambda Chi Alpha.
Haines, Foster Kingsley,	Peabody,	15 South College.
Hance, Forrest Sansbury,	Paterson, N. J.,	Theta Chi.
Hayes, Olin Henry,[1]	Lawrence,	M. A. C. Poultry Plant.
Hilliker, Harriett Franklin,[1]	East Lynn,	87 Pleasant Street.
Holmes, George Frederick,[1]	Ipswich,	60 Pleasant Street.
Howes, Donald Francis,	Ashfield,	11 North College.
Hunnewell, Paul Fiske,	Winthrop,	Phi Sigma Kappa.
Illman, Margaret Keble,	Schuyler Falls, N. Y.,	Draper Hall.
Johnson, Birger Lars,[1]	Dorchester,	Stockbridge Hall.
Lanphear, Marshall Olin,	Windsor, Conn.,	Kappa Sigma.
Lawrence, Lewis Henry,[1]	Falmouth,	83 Pleasant Street.
Lawton, Ralph Wilber,	Fall River,	3 South College.
Leonard, Ralph Stanley,	Melrose,	Lambda Chi Alpha.
Levine, Darwin Solomon,	Sherborn,	5 South College.
Lipshires, David Mathew,	Roxbury,	South College.
Loring, William Rupert,	Great Barrington,	South College.
Lyons, Louis Martin,	Boston,	East Experiment Station.
Mallorey, Alfred Sidney,[1]	Lynn,	51 Amity Street.
McRae, Herbert Rankin,	Malden,	4 Nutting Avenue.
Millard, Harold Baldwin,[1]	Great Barrington,	Veterinary Laboratory.
Mower, Carl Taft,[1]	Barre, Vt.,	Kappa Sigma.
Newton, Gaylord Arthur,	Durham, Conn.,	10 South College.
Phipps, Clarence Ritchie,[1]	Dorchester,	Theta Chi.
Popp, Edward William,	Albany, N. Y.,	13 South College.
Pratt, Oliver Goodell,	Salem,	Kappa Sigma.
Preble, John Nelson,	Jamaica Plain,	Theta Chi.
Raymond, Clinton Rufus,	Beverly,	Lambda Chi Alpha.

[1] Work incomplete.

Reumann, Theodore Henry,	New Bedford,	12 South College.
Richardson, Stephen Morse,[1]	Wellesley,	Q. T. V. House.
Ritter, Ernest,	New Britain, Conn.,	Theta Chi.
Roberts, Oliver Cousens,[1]	Arlington,	Theta Chi.
Rosequist, Birger Reignold,	Brockton,	14 South College.
Russell, Howard Leigh,	Worcester,	Theta Chi.
St. George, Raymond Alexander,	East Lynn,	Entomology Building.
Sanborn, Dean Waldron,	Conway,	Q. T. V. House.
Sawyer, Wesley Stevens,	Boston,	7 South College.
Schlough, George Hamer,	Waltham,	Lambda Chi Alpha.
Schwartz, Louis,	Melrose,	5 South College.
Smith, Carleton Tower,	West Newton,	6 South College.
Smith, Sidney Summer,[1]	Roslindale,	South College.
Stjernlof, Axel Uno,	Worcester,	15 South College.
Sullivan, Harold Leo,	Lawrence,	13 South College.
Tilton, Arthur Dana,	Wellesley,	Phi Sigma Kappa.
van Alstyne, Lewis Morrell,[1]	Kinderhook, N. Y.,	Phi Sigma Kappa.
Wooding, Paul Bennett,[1]	Yalesville, Conn.,	French Hall.

Class of 1919.

Alden, Dean Watson,[1]	Proctor, Vt.,	82 Pleasant Street.
Bagg, Quincy Austin,[1]	South Hadley,	9 North College.
Baker, William Alphonso,[1]	Melrose,	82 Pleasant Street.
Baker, William Herbert, Jr.,	Chesterfield,	88 Pleasant Street.
Batchelder, Stewart Putnam,	North Reading,	Q. T. V. House.
Blanchard, Carlton Douglas,	Uxbridge,	Kappa Sigma.
Bögholt, Carl Miller,[1]	Newport, R. I.,	Q. T. V. House.
Bond, Herbert Richard,	Needham,	Phi Sigma Kappa.
Bowen, Arthur Newton,[1]	Quincy,	7 South College.
Bowen, Maurice Stetson,[1]	Middleborough,	81 Pleasant Street.
Boyce, Alan Freeman,	Melrose,	83 Pleasant Street.
Boynton, Raymond Woods,[1]	Framingham,	Alpha Sigma Phi.
Brigham, Sylvia Bowen,[1]	Newtonville,	Draper Hall.
Buffum, Eliot Mansfield,	Waban,	College Store.
Burt, Henry John,	Arlington,	66 Pleasant Street.
Burton, Lee Williams,	Plainville,	3 North College.
Callanan, John Edward,[1]	Dorchester,	60 Pleasant Street.
Callanan, Vincent DePaul,	Malden,	Draper Hall.
Carpenter, Hall Bryant,	Somerville,	Kappa Sigma.
Carroll, Olive Evangeline,[1]	Dorchester,	33 East Pleasant Street.
Cassidy, Morton Harding,[1]	East Boston,	Lambda Chi Alpha.
Chandler, Arthur Lincoln,	Leominster,	12 South College.
Chapin, Frederic Charles,	Greenfield,	West Experiment Station.
Chase, Malcolm Willis,[1]	Amesbury,	94 Pleasant Street.
Chisholm, Robert Dudley,[1]	Melrose Highlands,	Phi Sigma Kappa.
Coderre, Ernest Laurier,	Southbridge,	Alpha Sigma Phi.
Collins, Robert Burleigh,	Rockland,	88 Pleasant Street.
Cosby, Alfred Francis,	Westfield,	15 Amity Street.
Crowe, Charles,[1]	Norwich, Conn.,	Kappa Sigma.
Day, Harold Ralph,	Milford,	Alpha Sigma Phi.
Dickinson, Victor Abel,[1]	Amherst,	Mount Pleasant.
Dunbar, Charles Oliver,[1]	Westfield,	84 Pleasant Street.
Erhard, Bena Gertrude,[1]	East Milton,	Draper Hall.
Erickson, Gunnar Emmanuel,	West Lynn,	9 South College.
Evans, Myrton Files,	West Somerville,	Kappa Sigma.
Faneuf, Ambrose Clement,[1]	West Warren,	Chemistry Laboratory.
Farrington, Robert Pierce,[1]	Nantucket,	15 Beston Street.
Faxon, Paul,[1]	Wellesley Hills,	Phi Sigma Kappa.
Ferris, Adaline Lawson,	Ridgefield Park, N. J.,	Draper Hall.
Ferriss, Samuel Boynton,[1]	New Milford, Conn.,	11 North College.
Field, Wilbert Daniel,[1]	Winter Hill,	29 McClellan Street.

[1] Work incomplete.

Fogg, Verne Allen,	Topsfield,	73 Pleasant Street.
French, Willard Kyte,	Worcester,	Q. T. V. House.
Garde, Earl Augustus,	Lynn,	30 North Prospect Street.
Garvey, Mary Ellen Monica,	Amherst,	27 South Prospect Street.
Glavin, William Francis,	Wenham,	North College.
Goff, Howard Mason,	Cambridge,	Phi Sigma Kappa.
Green, Lynn,[1]	Schenevus, N. Y.,	53 Lincoln Avenue.
Guba, Emil Frederick,	New Bedford,	Clark Hall.
Hall, Frank Edwin,[1]	Revere,	Lambda Chi Alpha.
Harris, Ethel Lovett,[1]	Beverly,	Draper Hall.
Hartwell, Richard Raymond,[1]	Springfield,	Colonial Inn.
Hastings, Louis Pease,	Springfield,	Kappa Sigma.
Hodgson, Benjamin Earl,	Methuen,	M. A. C. Farm House.
Hopkins, George Randolph Lawrence.	Orleans,	116 Pleasant Street.
Howe, Ralph Thomas,	Melrose Highlands,	120 Pleasant Street.
Hunter, Harold Clayton,[1]	South Hadley Falls,	9 South College.
Jewell, Charles Henry,	Merrimac,	M. A. C. Farm House.
Johnson, Lawrence Wilhelm,	Avon,	Alpha Sigma Phi.
Johnson, Sidney Clarence,[1]	Gloucester,	7 South College.
Jordan, Raymond Douglas,[1]	Springfield,	9 South College.
Knight, Frank Edward,[1]	Brimfield,	3 North College.
Knowlton, Priscilla,[1]	Roxbury,	87 Pleasant Street.
Liebman, Anna,	Dorchester,	Draper Hall.
Mansell, Elton Jessup,[1]	Cambridge,	Phi Sigma Kappa.
Mather, William,	Amherst,	West Experiment Station.
Mattoon, Charles Gordon,	Pittsfield,	2 North College.
McCarthy, Arthur Martin,	Monson,	Q. T. V. House.
Morse, Maurice,	Dorchester,	Entomology Building.
Morton, Elmer Joshua,[1]	Watertown,	Veterinary Laboratory.
Newbold, Douglas Tracy,	Northampton,	16 South College.
O'Hara, Joseph Ernest,[1]	Worcester,	8 Kellogg Avenue.
Parke, Robert Warren,	Winchendon,	1 Allen Street.
Parkhurst, Raymond Thurston,	Fitchburg,	Kappa Sigma.
Parsons, Edward Field,	North Amherst,	North Amherst.
Peck, George Newberry,	Granville,	9 South College.
Peirson, Henry Byron,	New Bedford,	Kappa Sigma.
Perry, Errol Clinton,[1]	Acushnet,	15 Hallock Street.
Peterson, Leroy Duane,[1]	Brooklyn, N. Y.,	85 Pleasant Street.
Pierpont, Frederick Trowbridge,	Stamford, Conn.,	18 Nutting Avenue.
Prée, Karl Julius,	Brookline,	88 Pleasant Street.
Pulley, Marion Gertrude,[1]	Melrose,	2 Allen Street.
Rea, Julian Stuart,	East Weymouth,	15 Beston Street.
Record, Harold Jordan,	West Boylston,	73 Pleasant Street.
Ross, Donald,	Boston,	Phi Sigma Kappa.
Rowe, Clifford Alton,[1]	East Orange, N. J.,	Phi Sigma Kappa.
Sargent, Walter Harriman,[1]	Malden,	4 Chestnut Street.
Sibley, Helen Aramintha,[1]	Longmeadow,	Draper Hall.
Skinner, Everett Hamilton,[1]	West Upton,	Kappa Sigma.
Smith, Wendell Frederick,[1]	Troy, N. Y.,	66 Pleasant Street.
Spaulding, Harold Edwin,[1]	Milford,	Aggie Inn.
Stafford, Irving Boynton,	Fall River,	6 Nutting Avenue.
Stevens, Chester Dillingham,	Reading,	120 Pleasant Street.
Stockwell, Ervin Sidney, Jr.,[1]	Sharon,	81 Pleasant Street.
Strack, Edward,[1]	Framingham,	Clark Hall.
Sutherland, Ralph,[1]	Cambridge,	13 South College.
Sweeney, William Joseph,	Dorchester,	North College.
Taylor, Edmund Billings,	Wollaston,	13 Phillips Street.
Thayer, Weston Cushing,[1]	Hingham,	1 South College.
Thomas, Frank DesAutels,[1]	Milford,	1 North College.
Tirrell, Loring Vinson,	South Weymouth,	Theta Chi.
Underwood, Arthur Leslie,[1]	Maynard,	11 North College.

[1] Work incomplete.

Vickers, John,[1]	Amherst,	90 Pleasant Street.
Wells, Marion Nichols,	Springfield,	Draper Hall.
White, Edward Asa,	Providence, R. I.,	11 South College.
Whittle, Clarence Parker, Jr.,[1]	Weymouth,	Phi Sigma Kappa.
Williams, Kenneth Sanderson,[1]	Sunderland,	Q. T. V. House.
Window, James Joseph,	Springfield,	5 Allen Street.
Wood, Oliver Wiswell,[1]	Arlington,	81 Pleasant Street.
Woodard, Chester Smith,[1]	Leverett,	Leverett.
Woodbury, Ray Willard,[1]	Newburyport,	Cottage Street.
Woodside, Wilfred Livingstone,	Boston,	73 Pleasant Street.
Yesair, John,[1]	Byfield,	Kappa Sigma.

Class of 1920.

Allen, Harold Kenneth,	Belchertown,	100 Main Street.
Andrews, George Henry,[1]	Farmington, Conn.,	1 School Street.
Apsey, George Wills, Jr.,	Winchester,	85 Pleasant Street.
Armstrong, Philip Brownell,	Rutherford, N. J.,	Phi Sigma Kappa.
Bacon, Milo Roderick,[1]	Leominster,	Draper Hall.
Bailey, William, Jr.,	Williamstown,	M. A. C. Farm House.
Ball, Harry Abraham,	Bridgewater,	16 North College.
Ball, Lorin Earl,[1]	Amherst,	3 Allen Street.
Beauregard, Winfield Scott,	Framingham,	15 North College.
Belcher, Daniel Webster,[1]	North Easton,	120 Pleasant Street.
Berman, Harry,[1]	Holyoke,	5 South College.
Berman, Louis,[1]	Dorchester,	9 Fearing Street.
Bigelow, Henry Charles,	Millville, N. J.,	90 Pleasant Street.
Blanchard, Kenneth,[1]	Highland Falls, N. Y.,	5 Nutting Avenue.
Boardman, Charles Meade,	Amherst,	33 Lincoln Avenue.
Brown, Roy Robertson,	Hudson,	Physics Building.
Bunker, Carroll Wooster,	West Somerville,	Q. T. V. House.
Burns, Allan Melville, Jr.,	Taunton,	88 Pleasant Street.
Campbell, George Murray,[1]	Baltimore, Md.,	Phi Sigma Kappa.
Cande, Robert Parsons,	Pittsfield,	23 East Pleasant Street.
Card, Ralph Hunter,	Somerville,	Cottage Street.
Carleton, John Foxcroft,	East Sandwich,	Draper Hall.
Center, Arthur Edwin,	Springfield,	73 Pleasant Street.
Clarridge, Fred William,	Milford,	88 Pleasant Street.
Clough, Alfred Arnold,	Wollaston,	Physics Building.
Cole, Frederick Eugene, Jr.,	South Portland, Me.,	88 Pleasant Street.
Crafts, Gordon Burnham,	Manchester,	Q. T. V. House.
Crawford, John Alexander,	Allston,	90 Pleasant Street.
Crimmin, Royce Brainerd,[1]	Bradford,	Lambda Chi Alpha.
Daggett, Clinton Jones,	Washington, D. C.,	Kappa Sigma.
Davenport, Frank Semore,[1]	Dorchester,	Alpha Sigma Phi.
Davidson, Donald Gordon,	Amherst,	7 Northampton Road.
Davis, Orrin Chester,	Belchertown,	90 Pleasant Street.
Delahunt, John Kersey,	Boston,	29 McClellan Street.
Derick, Glendon Robert,	Clinton,	13 Phillips Street.
Dewing, Warren Montague,	Kingston,	Kappa Sigma.
Doucette, Charles Felix,	Melrose,	M. A. C. Apiary.
Douglass, Donald Churchill,[1]	Cambridge,	Phi Sigma Kappa.
Dwyer, James Edward,	Sunderland,	Alpha Sigma Phi.
Earley, Marion Edith,[1]	West Newton,	87 Pleasant Street.
Emery, Herbert Martin,[1]	Newburyport,	5 North College.
Faber, Edward Stuart,[1]	Plainfield, N. J.,	77 Pleasant Street.
Farnsworth, Richard Wasgatt,[1]	Lancaster,	1 School Street.
Fuller, Lorenzo,	Lowell,	Lambda Chi Alpha.
Graff, Leland Sprague,[1]	Reading,	66 Pleasant Street.
Graves, Carlisle Ferrin,	Stamford, Conn.,	Alpha Sigma Phi.
Gray, Irving Emery,[1]	Woods Hole,	90 Pleasant Street.
Grout, Nathan,[1]	Sherborn,	60 Pleasant Street.

[1] Work incomplete.

Hale, Frank Thompson Caldwell,[1]	Byfield,	90 Pleasant Street.
Hamlin, Hazen Wolcott,[1]	Amherst,	90 Pleasant Street.
Harrington, Harold Leon,	Lunenburg,	44 Triangle Street.
Haslam, Emerson Francis,	Westwood,	101 Pleasant Street.
Haynes, Charles Francis,[1]	Canton,	13 Phillips Street.
Higgs, John Alden,[1]	Wareham,	120 Pleasant Street.
Hill, John Farren,	Egypt,	29 McClellan Street.
Hill, Theodore, Jr.,[1]	Jefferson Valley, N. Y.,	Lambda Chi Alpha.
Holland, Frank Harold,	Shrewsbury,	Plant House.
Holloway, John William,	Taunton,	5 Nutting Avenue.
Holmes, John Foster,	Needham,	Lambda Chi Alpha.
Horne, Robert Sanderson,[1]	Wellesley Farms,	Q. T. V. House.
Hurd, Davis Alden,[1]	Wellesley Hills,	36 North Prospect Street.
Hurd, Gordon Killam,[1]	Millbury,	36 North Prospect Street.
Iorio, Carlo Antonio,	Springfield,	75 Pleasant Street.
Jakeman, Brooks Franklin,	Winchester,	Lambda Chi Alpha.
Johnson, Conrad John,	Campello,	Lambda Chi Alpha.
Jones, Robert Lambert,	North Easton,	Q. T. V. House.
King, William Cutting,	Suffield, Conn.,	120 Pleasant Street.
Lambert, Richard Bowles,	Gleasondale,	Mathematics Building.
Lent, Donald Ashford,	Maynard,	90 Pleasant Street.
Levine, Maurice Eleazer,[1]	Sherborn,	10 North College.
Littlefield, John Edwin,	Lynn,	15 Hallock Street.
Lothrop, Earle Daniel,	West Bridgewater,	90 Pleasant Street.
Luce, William Alan,	West Boylston,	Lambda Chi Alpha.
Lyons, Henry Egmont,[1]	Boston,	East Experiment Station.
MacArdle, Herbert Aloysius,[1]	Worcester,	7 North College.
MacLeod, Guy Franklin,[1]	Lowell,	14 South College.
Mallon, Charles Hugh,	East Braintree,	Phi Sigma Kappa.
Maples, James Comly,	Port Chester, N. Y.,	81 Pleasant Street.
Martin, Laurence Paul,	Malden,	5 Allen Street.
McNulty, Raymond Henry,[1]	Amherst,	6 South East Street.
Meserve, Albert Wadsworth,	Framingham,	6 North College.
Millard, Helen Stanley,	Great Barrington,	Draper Hall.
Newell, Philip Sanger,	West Newton,	Phi Sigma Kappa.
Oppe, Herman DeWitt,[1]	Sandy Hook, Conn.,	94 Pleasant Street.
Peckham, William Harold,[1]	Newport, R. I.,	Alpha Sigma Phi.
Quadland, Howard Preston,	North Adams,	2 North College.
Readio, Philip Adna,	Florence,	90 Pleasant Street.
Redding, George Kenneth,	Melrose,	9 Fearing Street.
Reed, Morris,[1]	Worcester,	77 Pleasant Street.
Richards, George Henry,[1]	Springfield,	Phi Sigma Kappa.
Robertson, William Fenton,[1]	Framingham,	6 North College.
Sanborn, Joseph Raymond,	North Amherst,	North Amherst.
Sanderson, Ralph Hemenway,	Waltham,	18 Nutting Avenue.
Schandelmayer, Ralph Ernest,	Hudson,	Stockbridge Hall.
Scott, Clifton William,	Buckland,	17 Phillips Street.
Shattuck, Carl Winter,[1]	Jamaica Plain,	M. A. C. Farm House.
Shaughnessy, Howard John,	Easthampton,	17 Phillips Street.
Simmons, Lester Winslow,	Dighton,	75 Pleasant Street.
Smith, Donald Hiram,	Pittsfield,	23 East Pleasant Street.
Smith, Fred George,	Gardner,	3 High Street.
Smith, George Alfred,	Whitinsville,	Q. T. V. House.
Smith, Raymond Newton,[1]	Plainville,	3 North College.
Smith, Susan Almira,	Great Barrington,	Care of E. F. Gaskill.
Snow, John Dow,[1]	Arlington,	Phi Sigma Kappa.
Spencer, William,[1]	Worcester,	9 Fearing Street.
Stedman, Ralph Shaw,[1]	Springfield,	Phi Sigma Kappa.
Stiles, William Burling,	Great Barrington,	Lambda Chi Alpha.
Strecker, Edmund Herman,[1]	New York City,	Q. T. V. House.
Sullivan, Walter Mitchell,[1]	Lawrence,	14 South College.

[1] Work incomplete.

Sweeney, Frank Joseph,[1]	Whitman,	35 Hallock Street.
Taylor, Elliot Hubbard,[1]	Shelburne,	Q. T. V. House.
Taylor, Thornton Greenwood,[1]	Winchester,	Lambda Chi Alpha.
Urquhart, John Wardrop,	East Walpole,	29 McClellan Street.
Vigezzi, Mary Theresa,[1]	Great Barrington,	Draper Hall.
Williams, Allan Carruth,	Rockland,	16 North College.
Woodward, Ralph, Jr.,[1]	Grafton,	Colonial Inn.
Wright, Stuart Eldridge,	Raynham,	Kappa Sigma.

Class of 1921.

Alexander, Ralph Elmer,	Lynn,	17 Pleasant Street.
Alger, James Warren,[1]	Reading,	120 Pleasant Street.
Allen, Henry Vaughn,	Arlington,	7 Nutting Avenue.
Ames, Nathaniel Jackson,	Peabody,	81 Pleasant Street.
Andersen, Charles Henry,	Medford,	6 Nutting Avenue.
Baker, Louis Eliot,[1]	Salem,	41 Pleasant Street.
Baker, Russell Dexter,	Marshfield,	5 Allen Street.
Bartlett, John Lloyd Burnham,[1]	Westborough,	36 North Prospect Street.
Bennett, James Stanley,	South Meriden, Conn.,	3 Nutting Avenue.
Blackwell, Henrietta,	Boston,	North Amherst.
Blessington, James Bernard,	Lynn,	– –
Bowen, Willard Lee, Jr.,[1]	Natick,	North Amherst.
Brigham, John Dexter,	Sutton,	75 Pleasant Street.
Brown, Charles Henry,	Winthrop,	77 Pleasant Street.
Brown, Paul Bromby,	Brockton,	116 Pleasant Street.
Brown, Paul Wilfred,[1]	Fiskdale,	75 Pleasant Street.
Buck, Horace Gould,[1]	Easton,	120 Pleasant Street.
Calhoun, Saltean Frederick,	Brookline,	73 Pleasant Street.
Cameron, Viola Mary,[1]	Pelham,	East Pleasant Street.
Cascio, Peter Joseph,[1]	Willimantic, Conn.,	7 Nutting Avenue.
Channell, Frederick Charles,[1]	Winthrop,	35 North Prospect Street.
Chaquarian, George A.,[1]	Haverhill,	– –
Cook, Donald Homer,	Hadley,	Hadley.
Coombs, Roger Conklin,	Peabody,	M. A. C. Farm House.
Cooper, Lawrence Melville,	Charlemont,	36 North Prospect Street.
Day, Roland Wight,	Medfield,	83 Pleasant Street.
Dean, Herman Nelson,	Oakham,	90 Pleasant Street.
Edman, George William,	Orange,	4 Nutting Avenue.
Evers, Joseph Daniel,[1]	Malden,	Draper Hall.
Fenton, James Francis,	Amherst,	108 Pleasant Street.
Fisher, Leander Winsor,	Lynn,	31 East Pleasant Street.
Fletcher, Francis Summers,[1]	East Lynn,	31 East Pleasant Street.
Fogg, Lloyd Clarke,	Topsfield,	73 Pleasant Street.
Freeman, Stanley Leonard,[1]	Needham,	5 Nutting Avenue.
French, Carroll Brackett,	Lynn,	Corner Fearing Street and Lincoln Avenue.
Galusha, Mark Hampton,	Williamstown,	90 Pleasant Street.
Gaskill, Harland Everett,	Hopedale,	North Pleasant Street.
Geer, Herbert Leroy,	Three Rivers,	23 East Pleasant Street.
Goodstone, Sarah Winthrop,	Springfield,	11 South Prospect Street.
Gould, Robert Meredith,	Shelburne,	6 Nutting Avenue.
Hallett, Melvin Bernard,	Rockland,	5 Fearing Street.
Haskins, Harold Arthur,	North Amherst,	North Amherst.
Hathaway, Warren Sidney,[1]	Somerset,	Draper Hall.
Hayes, Elmer Russell,[1]	Somerville,	– –
Hemenway, Rachel Viola,[1]	Williamsburg,	Draper Hall.
Hodgson, Robert Moore,[1]	Newport, R. I.,	The Davenport.
Howard, Frederic,	Needham,	5 Nutting Avenue.
Howard, Winthrop Wilmarth,	South Easton,	29 North Prospect Street.
Kendall, Charles Donald,	Worcester,	83 Pleasant Street.
Kirkland, Lyle Lord,[1]	Chester,	77 Pleasant Street.

[1] Work incomplete.

Kokoski, Frank Joseph,	Hadley,	R. F. D. 3, Box 112.
Labrovitz, Edward Browdy,	Amherst,	11 Amity Street.
Lacroix, Donald Sewall,[1]	Newbury,	116 Pleasant Street.
Leavitt, Ralph Goodwin,	Melrose,	6 Nutting Avenue.
Lewandowski, John,[1]	Easthampton,	17 Phillips Street.
Lockwood, George Russell,	Hyde Park,	101 Pleasant Street.
Long, Albert Douglas,	Chicopee,	23 East Pleasant Street.
Lovering, Rolland Frederick,[1]	Northampton,	283 Prospect Street, Northampton.
Lyon, William Henry,[1]	Lexington,	120 Pleasant Street.
Mackintosh, Charles Gideon,	Peabody,	81 Pleasant Street.
Marsh, Walter Ashton,[1]	Holden,	31 East Pleasant Street.
Martin, Edward William,	Amherst,	19 South East Street.
McCarthy, Justin Jerimiah,[1]	Arlington,	Colonial Inn.
Meister, John Jacob,[1]	Dorchester,	7 Nutting Avenue.
Mellen, Richard Adams,[1]	Cambridge,	116 Pleasant Street.
Miller, Charles Norman,[1]	Chatham, N. J.,	16 Nutting Avenue.
Miller, William Henry,	Springfield,	120 Pleasant Street.
Millington, Walter Roy,	Maynard,	21 Amity Street.
Mutty, Allan Victor,	Melrose,	4 Chestnut Street.
Nuber, Ralph Everson,	Washington, D. C.,	77 Pleasant Street.
Palmer, Walter Isaiah,[1]	Amherst,	4 Chestnut Street.
Park, Francis Edwin, Jr.,	Stoneham,	Mount Pleasant.
Peck, Richard Charles,	Shelburne,	6 Nutting Avenue.
Platt, Charles Wilbur,[1]	Newtown, Conn.,	94 Pleasant Street.
Pratt, Laurence Francis,	North Weymouth,	75 Pleasant Street.
Preston, Everett Carroll,[1]	Dorchester,	2 Allen Street.
Quint, Isador Gabriel,	Roxbury,	41 Pleasant Street.
Reed, Paul Malcolm,	Baldwinsville,	75 Pleasant Street.
Reynolds, Francis Curtis,[1]	Hadley,	9 Phillips Street.
Rice, Henry Lawrence,[1]	Somerville,	4 Nutting Avenue.
Richardson, Marjory,[1]	Millis,	Draper Hall.
Richardson, Raymond Bradbury,	Brookline,	Care of Mrs. Fearing, Pleasant Street.
Robertson, Lafayette Janes,	Hartford, Conn.,	116 Pleasant Street.
Robinson, Philip Luther,	New Bedford,	66 Pleasant Street.
Rogers, Charles Beatley,	Malden,	21 Fearing Street.
Rosoff, Samuel,	Springfield,	41 Pleasant Street.
Russell, Charles Francis,	Winchendon,	1 Allen Street.
Russert, Marion Ruth,[1]	Roxbury,	Draper Hall.
Sanford, Richard Herbert,[1]	Westfield,	29 North Prospect Street.
Slate, George Lewis,[1]	Bernardston,	4 Chestnut Street.
Sloan, Kenneth Wilson,[1]	Amherst,	29 North Prospect Street.
Smith, Julian Denton,	Far Rockaway, N. Y.,	90 Pleasant Street.
Spencer, Orville Holland,	West Haven, Conn.,	101 Butterfield Avenue.
Starkey, Robert Lyman,	Fitchburg,	7 Nutting Avenue.
Stebbins, Frederick Osborne,	Deerfield,	120 Pleasant Street.
Stevens, Ralph Shattuck,[1]	Arlington,	Colonial Inn.
Stiles, Harry Stephen,	Lynn,	3 Nutting Avenue.
Stinson, Elton Salem,	Nampa, Idaho,	30 North Prospect Street.
Stockbridge, John Sylvester,	Atlanta, Ga.,	Kappa Sigma.
Thyberg, George Jonathan,	Springfield,	9 Fearing Street.
Tillson, Reginald Drury,	Whitman,	21 Fearing Street.
Van Lennep, Emily Bird,	Great Barrington,	21 Amity Street.
Webster, Milton Fuller,[1]	Malden,	73 Pleasant Street.
West, Guy Clifford,	Amesbury,	5½ Tillson Court.
Whittle, Wallace Lovering,	Weymouth,	13 Phillips Street.
Wilson, Charles William Schragey, Jr.[1]	New Rochelle, N. Y.,	66 Pleasant Street.
Wood, Clarence Milton,	Somerville,	90 Pleasant Street.
Zercher, Frederick Kaupp,	Jersey City, N. J.,	21 Amity Street.

[1] Work incomplete.

Probation.

Davol, Percy Wilfred,[1]	Brockton,	5 Farview Way.
Hastings, John Walter,[1]	Cliftondale,	36 North Prospect Street.
Jacobs, Albert Fullerton,[1]	Webster,	120 Pleasant Street.
Kilc, Trueman Eugene,[1]	Providence, R. I.,	77 Pleasant Street.
Kroeck, Julius, Jr.,[1]	Brooklyn, N. Y.,	7 Nutting Avenue.
McCormack, Ralph Roby,[1]	West Somerville,	36 North Prospect Street.
Rice, Gordon Alexander,[1]	Jamaica Plain,	7 Nutting Avenue.
Sampson, Howard Jenney,[1]	Fall River,	Butterfield Avenue.
Sandy, Cecil Henry,[1]	Worcester,	60 Pleasant Street.
Vinten, Charles Raymond,[1]	Roxbury,	116 Pleasant Street.

Unclassified Students.

Anderson, Gust William,	Brockton,	9 Fearing Street.
Austin, Walter Patrick,	Pittsfield,	120 Pleasant Street.
Blanchard, Margery Elizabeth,	Linwood,	87 Pleasant Street.
Burt, John Holton,	Hyde Park,	Care of E. M. Dickinson.
Burt, Richard Bartlett,	Hyde Park,	Care of E. M. Dickinson.
Carlson, Walter Mauritz,	Northborough,	Care of C. H. Thompson.
Conant, Luman Binney,	Waltham,	18 Nutting Avenue.
Crosby, Robert Francis,	Methuen,	31 East Pleasant Street.
Culver, Roger Lewis,	Williamsburg,	– –
Davis, Edwin John,	Holyoke,	Aggie Inn.
DeCouagne, Alfred Joseph,	Holyoke,	– –
Eastwood, John Edgar,	Plymouth,	81 Pleasant Street.
Fox, Stanley Richardson,	Dracut Center,	M. A. C. Farm House.
Fuller, Carroll Edward,	Portland, Me.,	Kappa Sigma.
Geoghegan, James Dewey,	Brighton,	5 Sunset Avenue.
Gerrish, Arthur Hermon,	Lowell,	35 North Prospect Street.
Gidney, Paul Donald,	Orange,	Care of B. F. Waid, Amity Street.
Goodhue, Joseph Gale,	Haydenville,	116 Pleasant Street.
Green, Howard Emery,	Westfield,	31 East Pleasant Street.
Hansen, Ernest,	Worcester,	18 Nutting Avenue.
Hibbard, Harry Benjamin, Jr.,	Dorchester,	4 Chestnut Street.
Hugo, Alvin Ernest,	Worcester,	36 North Prospect Street.
Humeston, Raymond Frederick,	Holyoke,	The Davenport.
Jones, Edward Charles,	Wrentham,	7 Nutting Avenue.
Kimball, Everett Foster,	Littleton,	35 North Prospect Street.
Marquedant, Isabel,	Grass Lake, Mich.,	79 Pleasant Street.
Mattoon, Max Watkins,	Pittsfield,	120 Pleasant Street.
Morris, Earle Leslie,	Springfield,	60 Pleasant Street.
Neill, Fred Alexander,	Clarion, Pa.,	15 Phillips Street.
Noble, Theodore Kingsbury,	New London, Conn.,	M. A. C. Farm House.
Novitski, Joseph Francis,	Amherst,	30 Cottage Street.
Pollard, Jane Isabel,	North Adams,	Draper Hall.
Prouty, Alfred Howe,	Spencer,	53 Lincoln Avenue.
Robinson, Harry Judson,	Taunton,	Care of E. M. Dickinson.
Robinson, Nathan Hale,	Braintree,	77 Pleasant Street.
Samuel, Dorothea,	Mount Airy, Pa.,	79 Pleasant Street.
Shannon, Mary,	Chester,	39 East Pleasant Street.
Stockbridge, Derry Lamal,	Atlanta, Ga.,	Kappa Sigma.
Strong, John Robert,	Pittsfield,	120 Pleasant Street.
Studley, Joshua,	Rockland,	5 Fearing Street.
Tanner, Willis,	Yokohama, Japan,	3 McClure Street.
Thompson, George Henry, Jr.,	Lenox,	4 Nutting Avenue.
Trulson, George Frederick,	Worcester,	3 Nutting Avenue.
Watson, Hawkesworth Douglas,	Walpole,	23 East Pleasant Street.
Waugh, Dorothy,	Amherst,	M. A. C.
Webber, Karl Durrell,	West Wrentham,	7 Nutting Avenue.

[1] Work incomplete.

Wheeler, William Edwin,	Bolton,	53 Lincoln Avenue.
White, George Edwin,	Worcester,	60 Pleasant Street.
Wing, Philip Henry,	North Grafton,	3 McClure Street.
Wright, Whitcomb Wadleigh,	Lowell,	35 North Prospect Street.

Special Students.

Cole, Robert Henry,	Three Rivers,	– –
Holland, Dorothy FitzGerald,	Summit, N. J.,	Mount Holyoke College.
Samper, Edward,	Colombia, S. A.,	3 Fearing Street.
Samper, Santiago,	Colombia, S. A.,	3 Fearing Street.

Vocational Poultry Students.

Baker, Howard William,	Wollaston,	5 Allen Street.
Brett, John Edward,	Pittsfield,	Aggie Inn.
Cleaver, Charles Leroy,	Hingham Center,	The Davenport.
Cook, John Herbert,	South Dartmouth,	8 Allen Street.
Tuttle, Kenneth Washburn,	Warren,	4 Chestnut Street.

Geographical Summary.

Massachusetts,	424
Connecticut,	19
New York,	14
New Jersey,	11
Pennsylvania,	5
Indiana,	1
Rhode Island,	5
District of Columbia,	3
Maine,	2
Vermont,	1
Georgia,	2
Michigan,	1
New Hampshire,	1
Idaho,	1
Kansas,	1
Kentucky,	1
Maryland,	1
Montana,	1
Oklahoma,	1
Colombia, S. A.,	2
Japan,	1
India,	1
South Africa, Transvaal,	1
Total,	500

Summary by Classes.

Graduate students,	29
Senior class, 1918,	64
Junior class, 1919,	113
Sophomore class, 1920,	117
Freshman class, 1921,	108
Probation freshman,	10
Unclassified students,	50
Special students,	4
Vocational poultry students,	5
Total registration,	500

Short Course Students, 1917.

The Ten Weeks' Course.

Aldrich, Leon F.,	Northampton.
Anderson, Ernest E.,	49 Marion Street, Medford.
Andrews, Nelson J.,	Amherst.
Armitage, Martin,	Gardner.
Bates, Richard,	West Medford.
Beal, Francis G.,	West Newton.
Bennett, Rosamond,	Auburndale.
Bent, Lawrence,	Watertown.
Bergmann, Col. C.,	West Toledo, Ohio.
Bergmann, Vincent,	West Toledo, Ohio.
Bradway, J. Leonard,	Monson.
Brett, John E.,	Pittsfield.
Briggs, Kenneth R.,	Wollaston.
Brown, Fred H.,	Melrose.
Brown, Lloyd A.,	Framingham.
Brown, Philip S.,	Swansea.
Buck, Paul T.,	Amherst.
Burcker, Wilhelm J.,	Englewood, N. J.
Butterfield, Wm. H.,	Brimfield.
Capen, Frank H.,	Stoughton.
Carter, Earl,	Boston.
Chamberlin, Marion,	Newton Center.
Churchill, Oliver C.,	West Somerville.
Cobb, Robert C.,	Chestnut Hill.
Coleman, Moses M.,	Mendon.
Cotter, James P.,	Salem.
Crawley, Melita,	Brookline.
Crockatt, Ernest,	Mount Hermon.
Crowley, William,	Suffield, Conn.
Crowell, B. P.,	Claremont, N. H.
Cushman, Burt A.,	Bernardston.
Danziger, Milton,	Washington, D. C.
Davenport, Vernon B.,	Orange.
Dow, Leon F.,	Livermore Falls, Me.
Dunham, B. K.,	Springfield.
Dwyer, J. Marcus,	Sunderland.
Fitzgerald, A. J.,	Braintree.
Foster, Charles H.,	North Andover.
Fox, Archer D.,	Amherst.
Gartin, Arthur,	Chestnut Hill.
Garvin, James,	Wrentham.
Gidney, Donald,	Orange.
Gilchrest, John G.,	Lunenburg.
Green, Howard W.,	Mount Hermon.
Gremmels, Charles E.,	West New Brighton, N. Y.
Gurdy, Elbert O.,	Lawrence.
Gustafson, Gustaf,	Springfield.
Gustafson, Paul E.,	Springfield.
Hallock, Genevieve,	Westborough.
Hammond, Frank,	Brookline.

Hassan, Sam,	Foxborough.
Herzog, Alfred C.,	Jersey City, N. J.
Hires, Linda S.,	Haverford, Pa.
Jackson, Henry T.,	Marlborough.
Jackson, Herbert A.,	North Amherst.
Jauncy, William,	Groton.
Kallis, Onnie S.,	Middlefield.
Kneeland, Karl W.,	Medfield.
La Point, Wilfred J.,	Amherst.
Lawley, Edith S.,	Amherst.
Logan, Nellie A.,	South Sudbury.
Lovenberg, Albert M.,	Putney, Vt.
MacGown, Ralph S.,	Sharon.
Marchant, Arthur L.,	Edgartown.
McIntyre, James B.,	Easthampton.
McWhinnie, John,	Boston.
Millington, Olive E.,	Wilmington, Vt.
Naughton, John,	Springfield.
Neleber, Benjamin,	Colchester, Conn.
Neleber, Louis,	Colchester, Conn.
Nelson, Hilman S.,	Roslindale.
Newton, Ernest L.,	Shrewsbury.
Newton, Orlo W.,	Amherst.
Ogden, Karl B.,	Winchester.
Ortloff, Henry S.,	Newton Center.
Parker, Orlo P.,	Brimfield.
Parks, Leroy B.,	Suffield, Conn.
Pearson, Franklin B.,	Fair Haven, Vt.
Pease, Robert S.,	Chester.
Prentiss, Russell I.,	Lexington.
Putnam, Avery W.,	Rutland.
Randolph, L. Fitz,	Arlington.
Rix, Anson F.,	Lawrence.
Roark, Joseph,	West Chelmsford.
Ryan, Frank J.,	West Newton.
Samaniego, Luis,	Antrim, N. H.
Savage, John B.,	Amherst.
Scott, J. Edmund,	Amherst.
Seaverns, Annie W.,	Jamaica Plain.
Seshong, Harold A.,	Campello.
Shumway, Alvah,	Florence.
Smith, Elmer D.,	Cheshire, Conn.
Smith, Howard C.,	Worcester.
Snow, Richard L.,	Brockton.
Southwick, L. H.,	Williamstown.
Stumpp, Robert E.,	Greenwich, Conn.
Tinker, Arthur A.,	Stamford, Conn.
Totman, Richard J.,	Conway.
Turner, Alfred W.,	Amherst.
Tuttle, Arthur E.,	Turners Falls.
Vincent, Edward,	Amherst.
Whitcher, George S.,	Atlantic.
Whiting, Henry T.,	Berkshire.
Whitney, Edmund,	Maynard.
Wickman, Irving G.,	Springfield.
Wilcox, G. Burton,	Manchester, Vt.
Winter, Oliver A.,	West Roxbury.
Wood, Harry E.,	Beverly.
Woodward, Leslie M.,	Saxonville.
Wright, Daniel H.,	Bartonsville, Vt.
Wright, Warren B.,	Amherst.

Summer School of Agriculture and Country Life.

Armstrong, Anna R.,	Rutherford, N. J.
Armstrong, Marian,	Rutherford, N. J.
Barker, Mary H.,	Worcester.
Barnard, Seymour,	Brooklyn, N. Y.
Barrett, Frances,	Adams.
Bayley, Louise,	Peacham, Vt.
Bealer, Elizabeth R.,	Jamestown, N. Y.
Bell, Mary V.,	Sharon.
Bourne, Edith L.,	Arlington.
Boynton, Anna L.,	Pepperell.
Bradley, Ruth J.,	Springfield.
Buell, Grace,	Wellesley Hills.
Butler, Gertrude M.,	Douglaston, N. Y.
Butler, Marianne E.,	Douglaston, N. Y.
Carlton, Mrs. Josephine,	Springfield.
Clarke, Elizabeth L.,	Williamstown.
Cooper, M. Claire,	South Boston.
Cotton, Edith F.,	Malden.
Cutting, Alice,	Waltham.
Cutting, Miss M. E.,	Middlebury, Conn.
Dame, Daisy G.,	West Medford.
Darrow, Ruth,	Cherokee, Iowa.
Davis, Elizabeth I.,	Taunton.
Davis, Mabel,	Auburndale.
Davis, Martha H.,	Auburndale.
Dodge, Rachel A.,	Grafton.
Eaves, Lucile,	Brookline.
Elder, Blanche,	Amherst.
Elder, Helen,	Amherst.
Farnam, Geraline E.,	Dalton.
Fisherdick, Florence M.,	Ware.
Flaherty, Jane S.,	Hadley.
Flaherty, Mary E.,	Hadley.
Flynn, Elizabeth C.,	Malden.
Frishmuth, Anna B.,	Boston.
Fuller, Edna,	Fredonia, N. Y.
Gavin, Madeline R.,	Roxbury.
Gee, Gretchen,	Fall River.
Gleason, Gertrude,	Newton Highlands.
Gleason, Mrs. Linnette,	Newton Highlands.
Goodnow, Edna M.,	Amherst.
Gould, Walter H.,	West Pelham.
Heatley, Elsie,	Wellesley.
Heatley, Margaret,	Wellesley.
Hitchcock, Caroline J.,	Amherst.
Hodsdon, Villa,	Cambridge.
Holmes, Miss R. M.,	Holyoke.
Hunt, Carrie A.,	Northampton.
Isquierdo, Bernardo,	New York City.
Jackman, Lucia L.,	Cambridge.
Kentfield, Annie L.,	Amherst.
Knox, Eloise,	Springfield.
Krall, Mabel,	Harrisburg, Pa.
Martin, Margaret,	Amherst.
May, Eleanor K.,	Jamaica Plain.
Maynard, Pearl A.,	West Newton.
Merrick, Marie,	Amherst.
Mills, Mrs. Frances Park,	Syracuse, N. Y.
Neal, Esther H.,	Williamstown.
Nelson, Lydia A.,	Jamestown, N. Y.
Newell, Mary W.,	Amherst.

Owen, Sarah,	Beaufort, S. C.
Page, Katherine,	Malden.
Palmer, Alice W.,	Shirley Center.
Pease, Elizabeth D. K.,	Brookline.
Plummer, Emma R.,	Newton.
Prince, Burton A.,	Westfield.
Rafter, Charlotte,	Dorchester Center.
Reed, Mrs. W. Maxwell,	Framingham.
Rice, Winifred,	Pittsfield.
Richardson, Sarah A.,	West Acton.
Robb, Genevieve,	Litchfield, Conn.
Ryan, Mabel F.,	Waltham.
Samper, Edward,	Amherst.
Samper, Santiago,	Amherst.
Sanger, Grace L.,	Boston.
Sargent, Jennette L.,	Boston.
Saunders, Bradford W.,	Cambridge.
Shipman, Julia,	Mattapan.
Smith, Mrs. Gertrude F.,	New Haven, Conn.
Smith, Claire E.,	Athol.
Swan, Annie L.,	Mattapan.
Tallman, Carlisle,	Amherst.
Teng, Shao-Ping,	China.
Turner, Wallace M.,	Providence, R. I.
Turner, Mrs. Wallace,	Providence, R. I.
Towne, Mary E.,	Brookline.
Walker, Mrs. G. S.,	Lexington.
Wright, Alfred E.,	Pittsfield.
Williams, Florence A.,	Pittsfield.

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